

NELSON'S ENCYCLOPÆDIA

VOL. IV.

Blicher—Byzantium

THOMAS NELSON AND SONS

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LIST OF CONTRACTIONS USED IN THIS WORK.

ac., acres.
 agric., agricultural.
 alt., altitude.
 anc., ancient.
 ann., annual.
 Ar., Arabic.
 Aram., Aramaic.
 arr., arrondissement.
 A.S., Anglo-Saxon.
 aver., average.
 bor., borough.
 bur., burgh.
 c. (circa), about.
 cap., capital.
 cf., compare.
 co., county.
 Com., Commission.
 comm., commune.
 cub. ft., cubic feet.
 Dan., Danish.
 dep., department.
 dist., district.
 div., division.
 Du., Dutch.
 E., east.
 eccles., ecclesiastical.
 ed., edition; edited.
 e.g., for example.
 Eng., English.*
 episc., episcopal.
 est., estimated.
 et seq., and following.
 F., Fahrenheit.
 fort. tn., fortified town.
 Fr., French.
 ft., feet.
 Ger., German.
 gov., government.

Gr., Greek.
 Heb., Hebrew.
 I., isl., island.
 ibid., the same.
 i.e., that is.
 in., inches.
 Ital., Italian.
 Lat., Latin.
 lat., latitude.
 l. bk., left bank.
 lit., literally.
 long., longitude.
 m., miles.
 mrkt. tn., market-town.
 Mt., mts., mount, mountain, -s.
 munic., municipal.
 N., north.
 N.T., New Testament.
 O.T., Old Testament.
 par., parish.
 parl., parliamentary.
 Per., Persian.
 pop., population.
 Port., Portuguese.
 prov., province.
 q.v., which see.
 R., riv., river.
 r. bk., right bank.
 R.V., Revised Version.
 ry., railway.
 ry. jn., railway junction.
 S., south.
 Sans., Sanskrit.
 seapt., seaport.
 Sp., Spanish.
 sp. gr., specific gravity.
 sq. m., square miles.

stn., station.
 s.v., under the word.
 Syr., Syriac.
 temp., temperature.
 terr., territory.
 trans., translated.
 trib., tributary.
 U.S.A., United States of America.
 vil., village.
 vol., volume.
 W., west.
 wat.-pl., watering-place.
 yds., yards.

Railways—C.R., Caledonian Railway;
 C.P.R., Canadian Pacific Railway;
 G.E.R., Great Eastern Railway;
 G. & S.W.R., Glasgow and South-Western Railway;
 L. & N.W.R., London and North-Western Railway;
 N.B.R., North British Railway, etc., etc.
 Bibliography—Biog. Dict., Biographical Dictionary; Encyc. Brit., Encyclopedia Britannica; Proc. a. Royal Geog. Soc., Proceedings of the Royal Geographical Society;
 Jour., Journal; Hist., History; Mag., Magazine, etc., etc.

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Vol. IV.

Blicher, STEEN STEENSEN (1782-1848), Danish novelist and poet. From 1819 he led the life of a poor parson, till his growing needs forced him to produce those works which have made him one of the favourite novelists of the Danish nation. Beginning with *En Landsbydegns Dagbog* (1824), he wrote a whole series of masterly tales of Danish, especially Jutish, peasant life, culminating in *E Bindstuen* (1842), written in the Jutland dialect, and incomparably his best work. What Hardy has done for Wessex, Blicher has done for Jutland, but in a spirit of bright and pleasant humour. See his own *Autobiography* prefixed to his *Samlede Noveller* (new ed. by P. Hansen, 1882); Kristensen and Lund, *Blicher's Liv og Gjerning* (1882).

Blickling Homilies. The unique MS. of the Blickling Homilies is at Blickling Hall, near Aylsham, in Norfolk. They belong to the time between Ælfred and Ælfric; they are not homogeneous in character, and may cover a wide period of time. The date 971 occurs in one passage. These homilies, full of legendary, apocryphal, unscriptural matter, form a striking contrast to those of Ælfric, who, as is clear from several passages, intended some of his own homilies as a corrective to them. See J. Earle's *A.S. Literature* (1884) and Wülker's *Grundriss zur Geschichte der A.S. Literatur* (1885). The homilies have been edited by Rev. R. Morris for the Early English Text Society (1874-80).

Blida, fort. tn., Algeria, 23 m. s.w. of Algiers, at foot of the Atlas Mts. It is famous for its orange groves. There is also some trade in copper, lead, and cotton. Pop. 31,000 (Europeans, 10,000).

Bligh, WILLIAM (1754-1817), English admiral, born in Cornwall; entered the navy, and saw service under Captain Cook in his second voyage (1772-4). As a lieutenant he took part in the action off the Dogger Bank in 1781, and in Howe's relief of Gibraltar (1782). In 1787 he took command of the *Bounty*, and, after his adventures on that voyage, was posted in 1790, and as a captain commanded the *Warrior* (1794) off Ushant, the *Director* at Camperdown in 1797, and the *Glutton* at Copenhagen in 1801. He became captain-general and governor of New South Wales in 1805, but, owing to his tyrannous conduct, was deposed in 1808, and imprisoned until 1810, when he was sent back to England. Undoubtedly a brave man and a first-rate seaman, he was one of the worst of tyrants in days when tyrannical naval commanders were only too numerous. See BOUNTY, MUTINY OF THE.

Blight is a popular term applied to the unhealthy condition of a plant due to a variety of causes, such as attacks of insects, fungi, noxious gases, unsuitable soil, frost, or lightning. See Marshall Ward's *Diseases in Plants* (1901).

Blimbing, a pulpy, yellowish, acid fruit, about the size of a hen's egg, and found on the cucumber tree (*Averrhoa bilimbi*) of the order Oxalidaceæ; the acidity is due to an oxalate of potassium. It is eaten by natives of India and E. Indies, and is also used in the form of pickles.

Blind. In medical terminology the expression 'blindness' means absolute sightlessness; what is popularly termed 'partial blindness' is known medically as amaurosis or amblyopia. Blindness cannot always be accounted for. In general, it may be said to arise from inflammatory or degenerative changes in some part of the path between the cornea without and the visual centre (or that part of the gray matter of the brain especially concerned in sight) within. The eye is so delicate an organ that inflammation of any part may easily spread to the others, and skilled assistance should be called in whenever its safety is concerned. The various forms of eye disease, such as cataract, keratitis, iritis, and conjunctivitis, are briefly touched on under their several headings. One, however—viz. ophthalmia neonatorum (sore eyes of the new-born)—is mentioned here because of its special importance. The disease starts with superficial inflammation of the eyes, caused by contagion during birth. It leads to ulceration and rapid destruction of the eyes, and is very contagious, being readily transmitted from the child to any one associated with it. But the mischief may be prevented by carefully washing the eyes at

birth with one part of corrosive sublimate to 6,000 parts of water; and then the eyes should be sponged every few hours with the same solution until skilled advice is obtained. Children are sometimes several months old before it is discovered that they are blind. By the third month the healthy child shows signs of recognition on seeing a familiar face; but even after a few weeks it will take pleasure in a bright light, and its perception of it can be tested by moving a candle before the eyes and noting whether they follow it. When over two months, the child with normal sight will blink when an object is suddenly thrust near its eyes.

TRAINING OF THE BLIND.—The first effort to ameliorate the condition of the blind was made in the latter part of the 18th century. Previous to that period they were a helpless pauper class, for whom neither education nor training was provided. The degraded state of the masses of the blind in France is shown by the following incident. In 1771, at an annual fair in Paris, an innkeeper had a group of blind men attired in a ridiculous manner, decorated with peacocks' tails, asses' ears, and pasteboard spectacles without glasses, in which condition they gave a burlesque concert for the profit of their employer. Among those who gazed at this outrage to humanity was the philanthropist Valentine Haüy (1746-1822). After he had gathered all the information possible respecting the blind, he began teaching a blind boy who had earned his living by begging at a church door. Encouraged by the success of his pupil, Haüy collected other blind persons, and in 1784 founded in Paris the first school for the blind (the Institution Nationale des Jeunes Aveugles), and commenced the first printing in raised characters. In 1786 he exhibited

before Louis XVI. and his court at Versailles the attainments of his pupils, and published an account of his methods, entitled *Essai sur l'Éducation des Aveugles*. As the novelty wore off, contributions almost came to an end, and the blind school must have ceased to exist had it not been taken in 1791 under the protection of the state.

The work of Haüy, the great apostle of the blind, was taken up by Mr. Gall of Edinburgh, Mr. Alston of Glasgow, Dr. Howe of Boston, Mr. Friedlander of Philadelphia, and others. The following were the first schools for the blind in Great Britain and Ireland:—School for the Indigent Blind, Liverpool (1791); Royal Blind Asylum and School, Edinburgh (1793); Bristol School (1793); School for the Indigent Blind, Southwark, London, now moved to Leatherhead (1799); Norwich Asylum and School (1805); Richmond Asylum, Dublin (1810); Glasgow Asylum and School (1827); Belfast School (for deaf and dumb and blind, 1831); Wilberforce School, York (1833); Henshaw's Asylum, Manchester (1839); School for the Blind, Birmingham (1848); Belfast Workshops (1871).

In 1868 Dr. T. R. Armitage founded the British and Foreign Blind Association, for the purpose of promoting the education and employment of the blind. By careful investigation he ascertained that of the blind musicians who had been trained in Great Britain not more than one in 200 became self-sustaining. To provide a higher education and improve the musical training of the blind, the Royal Normal College and Academy of Music was established at Upper Norwood in 1872. Its object was to afford the young blind a thorough general and musical education, to qualify them to earn a living by various

intellectual pursuits, especially as organists, pianists, teachers, and pianoforte tuners. Of all who have completed their course of training in the college, 89 per cent. are now self-sustaining men and women.

A practical system of education, which has for its object to make the blind independent and self-sustaining, must be based upon a comprehensive course of physical development. As a rule, the vitality of the blind is much below that of seeing persons, and it is the lack of energy and determination, not the want of sight, that causes so many failures among the blind.

Besides regular gymnastic training, we should endeavour to give young blind children that spontaneous activity and love of play which is the universal impulse of all healthy seeing children. The first requisite is a suitable playground, specially adapted to meet the wants of the blind. Besides a free space where they can run and play, it should have a supply of swings, tilts, jumping-boards, stilts, char-à-bancs, skittle alleys, etc. The pupils should be encouraged to enter various competitions, as walking, running, jumping, leapfrog, sack-racing, *barre-à-pied*, shot-pitching, and tug-of-war. Cycling, rowing, swimming, and roller-skating are also beneficial.

The school curriculum must be varied according to the age and capacity of the pupils, but the teacher's object should be to develop the powers of observation, train the reasoning faculties, strengthen the memory, cultivate the power of clear and concise expression, and stimulate a love of reading and literature. All children of average intelligence should be taught typewriting. From the earliest years manual dexterity should be cultivated by kindergarten work, modelling, sewing, knitting, and *styd*. Early

manual training cultivates the perceptive faculties, gives activity to the body, and prepares the hands and fingers for pianoforte playing, pianoforte tuning, and handicrafts.

Music in its various branches, when properly taught, is the best and most lucrative employment for the blind. The musical instruction, in its several branches of harmony, pianoforte, organ, and vocal culture, must be addressed to the *mind*, not merely to the *ear*. If the mental faculties have not been developed and thoroughly disciplined, the blind musician, however well he may play or sing, will be a failure as a teacher. The musical instruction must be more thorough, more analytical, more comprehensive than corresponding instruction given to seeing persons.

Pianoforte tuning is an excellent employment for the blind. Many can be trained to become successful pianoforte tuners when they have reached an age that renders training for the profession of music impossible. The seeing who excel in the business go through a long apprenticeship, and one must give the blind even more careful preparation.

A national scheme of education for the blind which has for its object to make the blind a self-sustaining class, should include properly-planned, well-regulated kindergarten schools for children from five to eight years of age, preparatory schools for children from eight to eleven, intermediate schools for children from eleven to thirteen. At thirteen years of age the future career of the children can usually be determined, and the pupils should be sent, according to ability and future requirements, either to handicraft schools or to colleges where they will be prepared for the university examinations, or receive a good secondary education combined

with high-class musical training; in connection with the latter there should be a pianoforte-tuning school.

In every school or class there will be a certain number of young blind children who are feeble in body and defective in intellect; such children are a great burden in any class or school, and require special treatment and instruction. Educational authorities throughout the country should unite and have one or two schools in a healthy locality for mentally defective blind children.

Types and Printing.—The earliest authentic record of reading for the blind describes a plan of engraving the letters upon blocks of wood, the invention of Francesco Lucas, a Spaniard, in the 16th century, who dedicated it to Philip II. of Spain. In 1640, Pierre Moreau, a writing-master in Paris, cast a movable leaden type for the use of the blind; but being without means to carry out his plan, he abandoned it. Pins inserted in cushions were next tried, and large wooden letters. After these came a contrivance of Du Puiseaux, a blind map, who had metal letters cast, and set them in a small frame with a handle. While these experiments were going on in France, attempts had also been made in Germany. Weissenburg of Mannheim, who lost his sight when about seven years of age, made use of letters cut in cardboard, and afterwards pricked maps in the same material. By this method he taught Mlle. Paradis (1759-1824), the talented blind musician and the friend of Valentine Haüy. To Haüy belongs the honour of being the first to emboss paper (1784) as a means of reading for the blind. His books were embossed in large and small italics, from movable type set by his pupils.

In 1827 Mr. Gall of Edinburgh

embossed some elementary works, and published the Gospel of St. John in 1834. His plan was to use serrated lines and replace curves by angles. In 1832 the Edinburgh Society of Arts offered a gold medal for the best method of printing for the blind, and it was awarded (1837) to Dr. Edmond Fry of London, whose alphabet consisted of ordinary capital letters without their small strokes. In 1836 Rev. W. Taylor of York, and Mr. Alston, in Glasgow, began to print with Fry's type. Almost simultaneously, in 1833, printing for the blind was commenced in Boston, U.S.A., and Philadelphia. Dr. S. G. Howe, in Boston, used small English letters without capitals, angles being employed instead of curves; while Mr. Friedlander, in Philadelphia, used only Roman capitals. About 1838 Mr. Lucas of Bristol, a shorthand writer, and Mr. Frere of Blackheath, each introduced an alphabet of simpler forms, and based their systems on stenography. In 1847 Dr. Moon of Brighton brought out a system which partially retains the outline of Roman letters. This type is easily read by the adult blind, and is still much used by the Home Teaching Societies. The preceding systems are all known as line-types, but the one which is now in general use is a point type.

In 1829, Louis Braille, a blind pupil in the Institution des Jeunes Aveugles, Paris, invented an alphabet in which the characters are formed by an arrangement of dots. Its signs are purely arbitrary, and consist of varying combinations of six points (· ·) placed in an oblong, of which the vertical side contains three and the horizontal two points. There are sixty-two possible combinations of these six points. The Braille system for literature and music was brought into general use in England by

the late Dr. T. R. Armitage. Unfortunately, the American institutions have adopted two modifications of the point type, and books are being printed for the English-speaking people in three different methods of point type. The original Braille is used by institutions for the blind in the British empire, in European countries, in Mexico, Brazil, and Egypt.

Apparatus.—For writing the point alphabet a simple and ingenious frame has been constructed. Recently Mr. F. Hall, superintendent of the School for the Blind, Jacksonville, Illinois, U.S.A., has perfected a Braille typewriter and also a stereotype-maker by which brass plates can be embossed and any number of copies printed. Mr. Stainsby of Birmingham has brought out a Braille shorthand writer modelled on the Hall machine.

Many ciphering boards have been constructed from time to time to enable the blind to work arithmetical problems. One of the earliest was that invented by Nicholas Saunderson, the blind professor of mathematics at Cambridge. The most recent, and the one now used in the United Kingdom, was introduced by the late Rev. W. Taylor. The board has star-shaped openings, in which a square pin fits in eight different positions. The pin has on one end a plain ridge, on the other a notched ridge, and sixteen characters can be formed with the two ends. This board can be used for algebra. Books are prepared with raised geometrical diagrams. Geography is taught by means of relief maps.

Chiefly owing to the unremitting energy and liberality of the late Dr. T. R. Armitage in connection with the British and Foreign Blind Association, all school appliances for the blind have been greatly improved and cheapened during the last thirty years.

STATISTICS.—Taking the census as a guide, the number of blind in proportion to the population has been steadily on the decrease since the year 1851, when statistics in regard to the blind were first scheduled. For instance, the figures show that in 1851, in England and Wales, there was one blind person to every 979; in 1861, one to every 1,037; in 1871, one to every 1,052; in 1881, one to every 1,138; in 1891, one to every 1,235; and in 1901, one to every 1,285. This result is probably due to improved ophthalmic surgery, and to especial attention being paid to the inflammation of the eyes of new-born babes, a disease which can be prevented and, if taken in time, cured.

There are in England and Wales 25 resident schools, 33 workshops, 46 home-teaching societies; in Scotland, 5 schools and workshops (combined), 9 home-teaching societies; in Ireland, 1 resident school (deaf, dumb, and blind), 5 workshops, 3 asylums (females), 2 home-teaching societies.

The trades usually taught to males are the making of baskets, brushes, mats, sacks, ropes, ship-fenders, brooms, mattress-making, upholstery, wire-making, chair-caning, wood-chopping, etc. Females are taught to make fancy baskets, brushes, chair-caning, knitting, netting, sewing (machine and hand), crocheting, etc.

Large sums have been left for granting pensions to the blind. The principal charities for this purpose are Day's, Hetherington's, the Clothworkers', the Cordwainers', National Blind Relief, and Royal Blind Pension Societies. In 1882 the late Henry Gardner left a bequest of £300,000 to the blind of England and Wales; a portion is given in pensions, but the larger part is devoted to education and training.

Parliament in 1893 passed an act granting elementary educa-

tion to blind and deaf children, and extended the age limit to sixteen. The education thus provided is inadequate.

In the United States, each state government makes liberal provision for the education and training of the blind. Although it costs much more *per capita*—from £40 to £60 per annum—the blind are as amply provided with the means of education as children that see. The national government appropriates \$10,000 per annum for printing embossed books for the blind. France, Germany, Austria, Russia, Norway, Sweden, Denmark, Belgium, Switzerland, Spain, and the English colonies provide by taxation for the education of the blind.

See Levy's *Blindness and the Blind* (1872); Wilson's *Biography of the Blind*; Armitage's *Education and Employment of the Blind* (2nd ed. 1886); Blair's *Education of the Blind* (1876); H. J. Wilson's *Information in regard to Institutions, Societies, and Classes for the Blind in England and Wales* (1887); Guille's *Instruction and Amusements of the Blind*; W. Harris's *Guide to Institutions and Charities* (new ed. 1884); Moon's *Light for the Blind* (3rd ed. 1877); Meldrum's *Light on Dark Paths* (1883); *Life of Miss E. Gilbert*; *Life of Professor H. Fawcett*; *Life of Dr. Moon*; Roth's *Prevention of Blindness* (1885), and *Physical Education of the Blind* (1885); *Report of Royal Commission* (1889); Reports of Conferences in England, America, and Europe; Reports of leading Institutions for the Blind; De la Sizeranne's *J. Claudet, his Life and Works, The Blind in Useful Avocations, The Blind in France, True Mission of Smaller Schools* (all in French); Helen Keller's *The Story of my Life* (1903); *Ten Years' Study and Work for the Blind* (1890); *The Blind as seen through Blind Eyes* (trans. by Dr.

Park Lewis, 1893); Mell's *Encyklopädisches Handbuch des Blindenwesens* (1900).

Blind, KARL (1826-1907), German author and revolutionist, was born in Mannheim. Condemned, for taking part in the revolution of 1848, to eight years' imprisonment, he was freed by the people and soldiery. Member of the embassy of Baden and Bavaria to Paris, he was there imprisoned, on the charge of participating in Ledru-Rollin's rising, and then banished from France. He went in 1852 to London, and there formed intimate relations with the leaders of European democracy—Mazzini, Garibaldi, Louis Blanc, etc. He furthered the Schleswig-Holstein movement, and fought in the war of 1870-1. His writings range over Germanic history, literature, and folklore, as well as politics.

Blind Spot IN THE EYE. This is that part of the retina which is insensible to light, and is the point pierced by the optic nerve.

Blindstory, in architecture, the middle story of a large church, over the pier arches and under the clerestory windows. The technical name is 'triforium,' as the gallery or open space between the vaulting of the nave and the roof of the aisles generally opens on the nave by triple apertures. The ornamental arrangement of the triforium varies considerably. In the Norman style it is often formed of a single complete arch, or of an arch subdivided into smaller ones, supported on diminutive shafts. In the Early English style a range of small arches is not uncommon, and sometimes two or more larger arches subdivided are used. In the Decorated and Perpendicular styles the space occupied by the triforium is often much reduced. In ancient times the triforium was appropriated to the use of females. Excellent specimens of

the triforium are to be seen at Winchester, Canterbury, Westminster, and Beverley.

Blind-worm, or SLOW-WORM (*Anguis fragilis*), a harmless lizard which differs from its allies in the absence of limbs. Eyes are present, so that both parts of the common name are misnomers. The Latin name refers to the fact that the tail is very brittle, as in the case of so many lizards. The food consists chiefly of earthworms and slugs, and the animal is more or less nocturnal in habit. It is usually yellowish brown in colour, but varies to some extent with the surroundings. It is widely distributed throughout Europe, and is viviparous.

Bliss, FREDERICK JONES (1859), American archaeologist and explorer, born at Mount Lebanon, Syria, and educated in America. From 1890 to 1900 he was explorer to the Palestine Exploration Fund, chiefly at Tell-el-Hesi and Jerusalem, and wrote *Excavations at Jerusalem, 1894-7* (1898), *A Mound of Many Cities* (1894), and *The Development of Palestine Exploration* (1906).

Bliss, PHILIP (1787-1857), English antiquary, edited Wood's *Athenæ Oxonienses* (1813-20) and *Autobiography* (1848), and Hearne's *Reliquiæ Hearnianæ* (1857). From 1824-53 Bliss was registrar of Oxford University.

Bliss, PHILIP PAUL (1838-76), born at Clearfield, Pa., U.S.A. He composed numerous hymns (*Hallelujah! 'tis done, Pull for the shore, Hold the fort*, etc.), which became exceedingly popular when utilized by Moody and Sankey in their evangelistic services.

Blister, a vesicle caused by a deposition of serous fluid beneath the skin, in consequence of a burn, the application of a vesicant, or disease, or friction. The same name is given to the therapeutic medium by which the blister is produced. The colour of a blister

shows the nature of its contents, amber colour indicating serum, opalescence pus, and red an admixture of blood. The treatment in general is to puncture, so as to allow the contents of the vesicle to escape slowly, and then to cover with boracic lint. Vesicants, or substances which cause blistering, are cantharides, glacial acetic acid, liquor ammoniac, liquor epispasticus or blistering fluid, 'Corrigan's button' or 'hammer,' a small flat iron or button heated and applied to the skin.

Blistering is the application of a vesicant near an inflamed part; it should not be directly over it, nor where the skin is loose, nor over any prominence of bone. The cantharidine of a blister may be absorbed and affect the kidneys injuriously, but this should be prevented by sprinkling powdered camphor over the blister before applying it to the skin. A blister left on too long may produce dangerous sloughing; six or eight hours are generally sufficient, when it should be replaced by a warm dressing or poultice. A blister should be opened by pricking the most dependent parts with a disinfected needle. The part should then be dressed with sterilized cotton wool or boracic lint. In the case of children, blisters must be used with special caution, being kept on only for an hour or until the skin is reddened, and then replaced by an aseptic poultice. A blister first acts as a local stimulant; if kept on long enough it causes a large discharge of serum, and so acts as a depletive and depressing agent. A blister over the heart will stimulate its action. Blisters are of service in many brain affections that are attended with congestion, in pleurisy with effusion, in pericarditis, and in effusion in joints. In the acid vomiting of gouty patients a blister over the epigastrium may give

relief, and some forms of neuralgia will yield to a vesicant over the seat of pain.

Blister Beetles, a name applied to the members of the family Cantharidae. See CANTHARIDES.

Blitum. See BILLITON.

Blizzard. A fierce and blinding snowstorm accompanied by high N. winds and a rapid fall of temperature to a point below 0° F. The gale drives before it ice-needles instead of snow, the flakes being virtually ice dust about one-twentieth of an inch in diameter. In severe blizzards the wind will blow at the rate of fifty miles an hour, with the thermometer at 62° below freezing-point; and it has been known to blow for 100 consecutive hours at the rate of over forty miles an hour. No one can live in these winds for any length of time; the painful effect of the blast loaded with ice-needles rouses a kind of frenzy, and many of those who have died from exposure have lost their senses completely before they have perished. Blizzards are most common in the W. and N.W. of the U.S.A., but the name is now in ordinary use elsewhere for severe snowstorms.

Bloch, CARL HENRIK (1831-90), a leading modern representative of Danish national painting; studied at the Copenhagen Academy (of which he was appointed professor in 1871), and painted Zealand and Jutland peasant life e.g. *The Dinner, The Fishermen's Home*—between 1854 and 1859. In Rome (1859-65) this many-sided artist painted the humorous side of monastic life, and became a historical painter. His chief works (e.g. *Christian II. a Prisoner in the Castle of Sonderburg*, and *Simson and the Philistines*) are in the gallery of the royal palace of Christiansborg at Copenhagen; while a fine piece, *The Deliverance of Prometheus*,

went to Athens. He was also a fine etcher. See Muther's *History of Modern Painting* (1895-96).

Bloch, JEAN DE (1836-1902), Polish banker, railway constructor and administrator, was born of Jewish parents, and educated at Warsaw. He wrote, in Russian, *Influence of Railways on the Economic Condition of Russia* (5 vols.), *The Finances of Russia* (4 vols.), and in 1898 *The War of the Future* (6 vols.), of which part has been translated into English under the title *Is War now Impossible?* (1899). The thesis of the last work, which has provoked considerable discussion, is that war between the great powers, such, for example, as between the Dual and Triple Alliance, is no longer possible as the arbiter of international disputes. Bloch points out (1) that the two great alliances are nearly equal in combined numbers, wealth, discipline, and moral qualities; (2) that modern weapons and tactical methods have so developed that the defensive force has gained an immense increment of strength which enables small bodies of men to defend a widely-extended front against superior numbers of the enemy for a protracted period; and (3) that the frontiers are now fortified on a most complete scale, and behind them are vast plains which the spade and magazine rifle can turn into impregnable fortresses. From these considerations he deduces that modern wars will be long wars, and must necessarily result in economic exhaustion, entailing starvation and the dislocation of the social fabric. At best they will result in a 'kind of stalemate,' with no decisive issue. The South African war (to which Bloch's thesis did not specifically apply) justified his theory as to the strength of the defence and the necessity for an overwhelming superiority of force

on the part of the attack, and further corroborated a variety of his minor conclusions. These points, however, many military experts hold to be mere commonplaces. His pamphlet, *Lord Roberts's Campaign and its Consequences*, predicted the long guerilla war which followed the fall of Pretoria, and suggested the blockhouse scheme which ultimately brought about the reduction of the country district by district. As for his theories in the case of the Russo-Japanese war, this much may be said—the losses on both sides due to the use of modern weapons were unprecedented, the fighting line was enormously long (100 miles in the case of the Japanese before Mukden), the resisting power of a modern fortress is exceedingly great, close formations entail murderous destruction, and the cost of warfare is so vast that the possibility of economic exhaustion on the part of one or other of the combatants must not be lost sight of. See also Angell's *Great Illusion* (1910).

Block. See PULLEY.

Block, MAURICE (1816-1901), political economist and statistician, was born in Berlin, but became a naturalized Frenchman. In 1862 he was under-secretary to the statistical bureau of the minister of agriculture, and in 1880 was elected member of the Academy of Sciences. Author of *Dictionnaire de l'Administration Française* (1892), *Petit Manuel d'Economie Pratique* (1890), *Précis de la Science Politique depuis Adam Smith* (1890), *Annuaire de l'Economie Politique et de la Statistique* (1856 et seq.), and *Petit Dictionnaire Politique et Social* (1896).

Blockade. The object of a blockade is to prevent an enemy from communicating, or conducting commerce, with the outside world by sea, in order to damage

his resources. A blockade may be in consequence either military or commercial—the former when it affects a fortified town or fleet, the latter when it affects commerce. Commercial blockades are perhaps the more important in their far-reaching effects. The most extensive blockade ever conducted was carried out by the Federals during the civil war in the United States. It extended from the Potomac to the Rio Grande, along the Atlantic coast, and over the Gulf of Mexico, for a distance of 3,000 miles, and lasted four years.

A blockade being an act of war, may be instituted by any recognized belligerent. Differing, as it does, from a siege in the way in which it affects neutrals, certain rules concerning it are adhered to by the leading nations. In a siege or blockade by land, the investing force is in occupation of territory of which it is in possession; whereas a blockading fleet occupies the sea, which is the highway of all nations. The rules which are accepted by Great Britain, the United States, and Germany are that a blockade may be a blockade *de facto*, or a blockade after notification. In the former case a neutral is not expected to be aware of the existing blockade, and, after a warning from the blockading squadron, has to leave the neighbourhood; in the latter case a vessel is subject to capture, ignorance of the blockade being no excuse. The system followed by the French, Italian, Spanish, and Swedish governments is to give a general notification, and a particular one to each ship from one of the vessels of the blockading squadron. It is probable that this system will be superseded, for the reason that the existence of the telegraph almost precludes any possibility of ignorance, and because it would be dangerous,

in these days of vessels of high speed, to allow them to approach for inquiry or warning. As Judge Field observed, the greatest facilities would be afforded to elude the blockade.

Various opinions have been held as to what constitutes an effective blockade. In 1742 France and Denmark agreed that at least two vessels were necessary, or a battery on shore. At a later date Holland and Sicily agreed that six vessels just out of gunshot were necessary, or else batteries on shore that were able to prevent ships from entering the port. The Declaration of Paris of 1856, by giving a greater elasticity, has probably brought the matter nearer to practical solution by laying down that blockades to be obligatory are to be effective—that is to say, maintained by a force sufficient to shut out the access of the enemy's ships and other vessels in reality. In 1862, in a note to the United States, the government of Great Britain said that it was of opinion that the fact of a few vessels having managed to run a blockade did not prevent it from being an effective blockade according to international law.

There are various rules in regard to blockade that have been adopted by common consent for convenience. A ship, for instance, is not liable to capture if, on arriving at the scene of blockade, her papers show that she began her voyage in ignorance of it, and was directed to make inquiry, and to proceed, if necessary, to an alternative destination. A vessel, further, for the sake of humanity, is allowed, if in danger or distress, to enter a blockaded port. If a neutral ship be in port when a blockade begins, she is given fifteen days for clearing. Mail steamers, on condition that no contraband of war is carried, are allowed in and out of a blockaded

port. In the United States war with Mexico, British mail boats ran in and out of Vera Cruz. Neutral men-of-war are by consent and custom, but not by right, allowed ingress and egress. See H. Wheaton's *Internat. Law* (4th ed. 1904); W. E. Hall's *Internat. Law* (6th ed. 1909); Freeman Snow's *Lectures at the Naval War Coll.* (1895). See also DECLARATION OF LONDON; DECLARATION OF PARIS.

Block-books, books printed from engraved wooden blocks, one block generally serving for an entire page. A large number of these were produced in Central Europe, chiefly in Germany, also in Holland, during the years that immediately preceded (say 1435 onwards) the invention of typography, or printing from small movable types. Some of them consisted wholly of pictures; others contained explanatory text. It is not known with certainty whether a rude kind of press was used, or whether they were produced by rubbing the back of the paper as it lay on the block. Only one side of the paper was printed on, the two blank sides being afterwards pasted together.

Blockhouse, originally a detached fort blocking or covering the access to a landing, a narrow channel, a mountain pass, a bridge, or other strategical point. It may be constructed of timber, stone, or metal, and is loopholed and embrasured for rifle-firing. The most recent use of the blockhouse was in the war (1899-1902) with the Boers in S. Africa, where the system was employed by Lord Kitchener to protect the railways and lines of communication.

Blocking Course, in masonry, a course of stones laid above a projecting cornice, in order that its weight may prevent the latter from falling, where the centre of gravity of the cornice is rather far forward.

Block Island, an isl., Rhode Island State, U.S.A., 10 m. off shore and 14 m. n.w. of Montauk Point, Long I. It is pear-shaped its longest axis, 8 m., running N. and S. It constitutes Shoreham co., and is a popular summer resort. There is a small light on the N. extremity, and a light on the S.E. visible for twenty miles. It was first visited by Adrian Block in 1614. See Livermore's *Hist. of Block Island from 1614 to 1876* (1877).

Blocksberg. See BROCKEN.

Block System. See RAILWAYS.

Bloemendaal, vil., N. Holland prov., Netherlands, 2 m. N. of Haarlem. Pop. 6,000.

Bloemfontein, cap. of Orange Free State prov., Union of South Africa, 575 m. N.E. of Cape Town and 350 m. N. of Port Elizabeth; healthily situated at an elevation of 4,518 ft., on an extensive plain, which gives it some repute as a health centre. It contains the council chamber of the former republican government, the residence of the former presidents, and a museum. It was occupied by Lord Roberts on March 13, 1900. It is now the official seat of the Supreme Court of the South African Union. Pop. 17,000 whites and 16,000 natives.

Blois, anc. tn. and cap. of dep. Loir-et-Cher, on r. bk. of Loire, 35 m. by rail S.W. of Orleans. The cathedral (Late Gothic) was rebuilt in 1678. The oldest part of the castle (Tour des Oubliettes) dates from the 13th century. Joan of Arc raised her standard here in 1429. The town manufactures vinegar, chocolate, earthenware, shoes, and bricks, and has some trade in wine, corn, and timber. Pop. 24,000. See Lo Nail's *Le Château de Blois* (1874).

Blok, PETRUS JOHANNES (1855), Dutch historian, born at Helder; professor of history at Groningen (1884) and Leyden (1894); has written *Geschiedenis van het Ne-*

derlandsche Volk (8 vols. 1891-1907; Eng. trans. by Miss Putnam, 1898, etc.), and books on the history of Dutch towns (1883 and 1884).

Blomefield, FRANCIS (1705-52), topographer of Norfolk, England, born at Fersfield. The work of his life, the *History of Norfolk*, is a mine of information on the county. The third volume he did not live to finish. Continued by C. Parkin, the work appeared in 5 vols. (1739-75), and in 11 vols. (1805-10).

Blomfield, CHARLES JAMES, (1786-1857), bishop of London, was born at Bury St. Edmunds. He had a brilliant career at Trinity College, Cambridge, of which he was elected a fellow. Between 1810 and 1815 he published editions of several of the plays of Æschylus, an edition of Callimachus, and (in conjunction with Dr. Monk) the *Posthumous Tracts of Porson* (1812) and the *Adversaria Porsoni* (1814). Blomfield became rector of St. Botolph's, Bishopsgate (London), in 1819, bishop of Chester in 1824, and then bishop of London (1828-56). During his London episcopate more than two hundred churches were built, and he was also mainly instrumental in establishing the Colonial Bishops' Fund. See *Memoirs of Bishop Blomfield*, by the Rev. A. Blomfield (1863).

Blommaert, PHILIP (1808-71), Flemish author, born at Ghent. One of the chief revivers of the Flemish idiom, he edited its poetry of the 12th to the 14th century, including *Theophilus* (1836; new ed. 1858), which bears some resemblance to *Faust*, and *Oudvlaemsche Gedichten* (1838-51). He also translated the *Nibelungenlied* into Flemish. *Aloude Geschiedenis der Belgen* (1849) is influenced by anti-French sentiment.

Blommer, NIS JOHAN OLSSON (1816-55), Swedish painter of land-

scape and prose myths, born at Blommeröd in S. Sweden. His effort was to represent what lies in the poetry of the people, and all the mythical figures which belong neither to definite age nor to definite poets, but constitute rather the expression of national sentiment. Among his works are *The Faithful Sister*, *The Bachelor and the Elves*, *Necken's Sport*.

Blommers, B. J., a living Dutch painter of interiors, landscapes, peasant and fisher life. By choice of subject he resembles Israels, except that he depicts the joy of life and not its tragedy. His *Girl Knitting* and *Shrimpers* are in the Amsterdam National Museum; another good specimen of his skill is *Mother's Joy*. Many of his pictures are in private collections in Glasgow, Edinburgh, and London. See *Rooses, Dutch Painters of the 19th Century* (1898-1901).

Blondel, famous *trouvère* of the 12th century, a native of Nesle in Picardy; was the friend of his fellow-minstrel, Richard Cœur de Lion, king of England. Richard, returning from the Holy Land, was captured by Leopold, Duke of Austria, and thrown into the dungeon of Dürrenstein, where he was discovered by Blondel, whose song was answered by Richard from the tower. Speeding to England, Blondel arranged for the payment of the ransom which set Richard free. The earliest trace of this legend occurs in the *Chronicle of Rheims* (13th century); no mention of it is found in Blondel's (*Blondain's*) acknowledged poems (vol. xix. of Tarbé's ed. *Collection des Poètes Champenois*, Rheims, 1862).

Blondin, CHARLES (1824-97), acrobat and tight-rope walker, whose real name was Jean François Gravelet, was born at St. Omer; trained at Lyons; engaged in a tour through the United

states; crossed Niagara on a tight rope in five minutes, June 1859; and settled in England during the last thirty years of his life. In 1862 he took an engagement at the Crystal Palace, and performed at a height of 170 ft. from the ground. He considered his most difficult feat was walking from the mainmast to the mizzen on the P. & O. steamer *Poonah* while on a voyage to Australia. After spending several years in retirement he reappeared in public, and died at Ealing.

Blood, the red fluid which circulates through the heart, arteries, capillaries, and veins, supplying nutrition to all parts of the body, and conveying waste substances from the tissues to those organs by which they are excreted. Human blood is bright red in the arteries, dark in the veins, of an average sp. gr. of 1.055, of a salt taste, faint odour, an alkaline reaction, and a temp. of 100° F. in the interior of the body, but lower in the extremities and on the surface. It holds in suspension large numbers of cells or corpuscles. The fluid itself is called the *plasma* or *liquor sanguinis*. The corpuscles are of two kinds—red and white. In a cubic millimetre of normal human blood there are five million red and ten thousand white corpuscles. The red give the colour to normal blood; they contain a pigment, hæmoglobin, a complex proteid substance containing about 0.4 per cent. of iron. The red corpuscles are round discs $\frac{1}{2500}$ of an inch in diameter and $\frac{1}{12500}$ of an inch thick, and are of a light yellowish tint when seen under the microscope. When freshly-drawn blood is examined under the microscope, the red corpuscles are seen to run together, forming 'rouleaux.' The form of these red cells may be altered by various diseases—e.g. pernicious anæmia; and another alteration due to disease is the appearance

of nucleated forms, of different size. The number of the red cells may also vary: the term 'poly-cythæmia' is applied to those conditions in which the number of red cells is higher than normal, as contrasted with oligocythæmia, which means a decrease in number. The former condition arises when an animal is taken from a low to a high altitude; the latter is present in all forms of anæmia. The white blood corpuscles, or leucocytes, though much less numerous than the red ones, have important functions. They are derived from lymph corpuscles, the cells of lymphatic glands, spleen, and pancreas; some of them (phagocytes) devour bacteria, dead or degenerate tissue, the products of inflammation, etc., and so have been called 'blood scavengers.' But they not only destroy what is effete; their normal secretions, especially those of the granular forms (for there are several kinds of leucocytes), have been shown to be essential to the economy of the body. Other solid elements in the blood are 'blood plates,' round bodies less than half the diameter of red corpuscles; they do not, as a rule, contain hæmoglobin, but are rich in phosphates and glycogen, and are supposed to aid in coagulation. Granular bodies also are found in blood: they are small, round, and highly refractive; seem to be derived from leucocytes, degenerating red cells, and blood plates; and form precipitates in the blood plasma.

Chemical Composition.—In the red cells the main constituents are hæmoglobin (a globulin which coagulates at 167° F.), lecithin, cholesterol, and salts of potassium, sodium, iron, calcium, and magnesium. The most important salts are the chlorides and phosphates. There is about 70 per cent. of water. The hæmoglobin, which takes up oxygen in the lungs and carries it to all the tissues, is by

far the most important constituent. The leucocytes are rich in a protein, 'nucleo-histin;' and the large proportionate quantity of phosphorus in the cells depends mainly on this substance and on lecithin. The number of leucocytes increases after a meal, and is proportionately larger in the pregnant, the newly-born, and in those suffering from certain diseases. (See LEUCOCYTHÆMIA and LEUCOCYTOSIS.)

Plasma and Serum.—While blood corpuscles and plasma form normal blood, clotted blood consists of clot and serum. The plasma is alkaline, yellowish in tint, of sp. gr. 1·025–1·029; 100 parts of plasma contain water 90·3, and solids 9·7. The characteristic proteins of serum are serum globulin, serum albumin, and fibrin ferment; those of the plasma are fibrinogen, serum globulin, and serum albumin. The gases of plasma and serum are small quantities of oxygen, nitrogen, and carbon dioxide.

The coagulation of blood may be observed in blood which has been drawn into an open vessel. In two or three minutes the surface of the fluid becomes semi-solid or jelly-like, and this change extends in eight or nine minutes throughout the mass. It is supposed that when blood is in the body it contains a globulin 'fibrinogen,' and that when it is shed the fibrinogen molecule is split up into a globulin which remains in solution, and 'fibrin ferment' which does not exist in healthy blood, but is a product of the disintegration of the white corpuscles and blood plates produced when the blood leaves the vessels or comes in contact with foreign matter. Methods have been devised for estimating the total quantity of blood, the volume of the corpuscles and plasma, the specific gravity, and the alkalinity. The quantity of hæmoglobin is

estimated by colour tests, and the number of red corpuscles within a given volume is counted under the microscope in the hæmocytometer. The bacteriological examination of blood has yielded valuable results, as, for example, in 'Widal's reaction,' which is valuable in the diagnosis of typhoid fever. The recently discovered test of the opsonic index of the blood is an important aid in diagnosis and treatment. See SERUM THERAPY.

Blood, AVENGER OF (Heb. *goel had-dam*), a title given to one who pursued a manslayer to avenge the death of his kinsman. Hebrew law stands between primitive custom, which puts the duty of avenging murder on the kindred of the murdered, and modern law, which puts it on the state. Thus it is the kinsman, not the state, who executes justice (Deut. 19: 12); but the manslayer can flee to the altar or the cities of refuge, and there lay his case before the elders (Josh. 20: 4 f.); in Num. 35: 24 f. the congregation decides between him and the *goel*. In this way a certain check was given to the blood-feud. It is noteworthy that Hebrew law forbade compensation for murder (Num. 35: 31 f.), which the Koran allows. See W. R. Smith's *Religion of Semites* (1891), p. 33 f.

Blood, THOMAS (c. 1618–80), English adventurer, usually styled Colonel Blood. For his military services on the parliamentary side he was rewarded with Irish estates, which he lost at the restoration, but received again from Charles II. His most notorious exploits were the plot to surprise Dublin Castle and seize the lord-lieutenant, in 1663; the rescue of his friend Captain Mason from a guard of eight troopers near Doncaster; the attempt to kill the Duke of Ormonde, in 1670; and the theft of the crown jewels in 1671, for which he was imprisoned, though

shortly after released by the king.

Blood Flowers are species of *Hemeranthus*, order Amaryllidaceae, from S. Africa. The flowers vary from white to crimson, and most of them have conspicuous and showy bracts. About forty species are used as greenhouse and sometimes as border plants in Britain. The juice of *H. toxicaria* is used by natives for poisoning their arrows.

Bloodhound, one of the oldest breeds of British dogs, though the present type is very different from the animal used as a dog of war in the 15th and 16th centuries. The art of the breeder has emphasized those features which give dignity and nobility of appearance; and the modern bloodhound, with its peculiarly pointed or dome-shaped skull, its crimson 'haws,' its many wrinkles, its solemn aspect, and its long, pendulous leathers or ears, perhaps carries characteristics to excess. Although popularly associated by name and reputation with fierceness to its human quarry, the bloodhound is a singularly docile, affectionate, and intelligent beast, and an admirable protector and companion to child or adult. A savage bloodhound is rare. Although the old vocation of the dog is gone, modern bloodhound trials have proved that, over ground less frequently trodden than a pavement, the animal retains its acute scent for human blood. It is equally ready to follow any of the chemical preparations used for hunting by 'drag.'

The descent of the English bloodhound is traced to the famous hounds of St. Hubert; but while these were black or white, the modern bloodhound is prejudiced by any admixture of white, except perhaps on the tip of the 'stern' or tail. The Cuban bloodhound, formerly used for hunting runaway slaves, is probably a col-

lateral race from a Spanish stock, but lacks the superb qualities of the English type. There have been many celebrated breeders who have devoted their energies to keeping the strain pure, among whom may be noticed (in past years) Lords Yarborough, Fitzwilliam, and Faversham, the Hon. (Grantley) Berkeley, Mr. Jennings of Pickering (owner of the celebrated 'Druid'), Mr. Cowen of Blayden-on-Tyne, and Mr. Holford of Ware (owner of 'Regent,' another magnificent hound). But in fostering 'type,' close breeding has been resorted to, with the usual result of defective constitution, and a large percentage of deaths among whelps.

The following are the points of the bloodhound as laid down by Mr. Edwin Brough, one of the leading breeders:—'Skull long, narrow, and very much peaked; muzzle deep and square; ears set on very low, long, thin, and hanging in graceful folds close to the face; deep-set eyes, with triangular lids, showing the red haw; flews long, thin, and pendulous, the upper lip overhanging the lower one; neck long, with profuse dewlap; skin of face very loose and wrinkled; coat close; skin thin; shoulders deep and sloping; brisket well let down; loins broad and muscular; powerful thighs and second thighs; good legs; round feet; hocks well bent; tapering, lashing stern. Colours, black and tan, red and tawn, tawny.' To this may be added a graceful carriage, and a very grand and sonorous voice, although not often heard when following the trail. The eye should be of a dark hazel colour, and full of aristocratic expression. The average weight of a dog is 90 lbs.; of a bitch, 75 lbs.; and the heights 26 and 24 inches respectively.

Blood-poisoning. See SEPTICÆMIA.

Blood-rain, a red rain which often occurs in Italy and S. Europe. The colour is traced to microscopic dust, of a brick-red colour, borne high into the air by winds from the African desert.

Bloodroot (*Sanguinaria canadensis*), a N. American plant of the poppy order. Its rhizome and roots have a red juice. It is grown as a hardy perennial in Britain, producing glaucous leaves and conspicuous white flowers with masses of yellow stamens. The plant is about six inches high, and makes an effective show. The name is also applied to species of the order Illecebraceae, which is related to the Amaryllids. The plants are found in America, Australia, and S. Africa. Some Australian species have a red juice, and their roots are eaten by the natives. Another bloodroot is *Cleome canadense*, order Rosaceae, of N. America.

Blood-stains. In medico-legal investigations it is often of the utmost importance to determine whether stains are due to blood. The investigation is often carried on under difficulties: the stains may be small, old, or on foul linen, and a simple test should first be tried. Touch the spot with ammonia: if it turns a greenish tint, it is not blood, but probably a vegetable stain; if it does not alter, then various other tests may be tried. (1.) Take a small fragment of the stained fabric, place it on a colour-slab; add to it one or two drops of a freshly-prepared solution of guaiacum in alcohol, mix, then add a drop of ozonic ether. If blood is present, a blue colour results; if not, no colour change takes place. This test is most trustworthy when it yields a negative reaction; for other substances besides blood—such as gluten, raw potato, milk, and bile—give a blue colour with guaiacum. (2.) Cut out a piece of the stained fabric, and saturate it with glacial

acetic acid, to which add a crystal of table salt if the stain is old. Press the fluid from the piece, evaporate it, and examine it microscopically when cool. If it is blood, the resulting crystals will be a yellow brown or claret colour, and yield a blue reaction with guaiacum. They are hydrochlorate of hæmatin, and usually occur in the form of rhombic plates. (3.) But by far the best test is the spectroscopic, and for this a small quantity of blood is sufficient. The spectrum of oxyhæmoglobin is characterized by the presence of two absorption bands between the lines D and E. But often the blood will have passed, by exposure to the air, from the condition of oxyhæmoglobin to that of methæmoglobin before the stain is examined; and the spectrum of methæmoglobin is like that of oxyhæmoglobin, with the addition of a thin band in the red nearer the C line than the D. The microscopic examination of the red corpuscles is useful in the case of fresh stains; but all the mammalia, with the exception of the camel, have blood corpuscles like those of man, and the difference in size is so slight that it is impossible to discriminate one from the other. The corpuscles of birds, fishes, and reptiles are more or less oval; those of the camel are large, oval, and nucleated. The results of recent research have placed at the disposal of the medical service very delicate methods of differentiating human blood from that of other animals, and, indeed, of distinguishing between the blood of different animal species. An admirable account of these useful and highly technical tests is given in *Blood Stains: their Detection and the Determination of their Source*, by Major W. D. Sutherland, M.D., I.M.S. (1907).

Bloodstone, a name given to a variety of chalcedony or plasma,

distinguished by the presence on a dark-green ground of blood-red spots, apparently due to red oxide of iron. It has been much used for rings and brooches those varieties being most valued in which the red spots are bright, well defined, not too irregularly scattered, and contrast well with the dark-green colour of the body of the stone. It is found in Iceland, the Hebrides, and in larger quantities in India and Australia. Heliotrope is another name applied to bloodstone. See Streeter's *Precious Stones and Gems* (1898).

Bloodworms are the aquatic larvae of gnats, belonging to the genus *Chironomus*. They are long, slender, worm-like creatures, which contain the red blood pigment hæmoglobin, and do not at first possess the ordinary tracheal system of insects. They occur in stagnant water.

Bloomer Costume. This form of dress was introduced into America in 1851 by Mrs. Bloomer of New York. It consists of an ordinary bodice, and a skirt falling just below the knees, over full trousers gathered at the ankles. The fashion was adopted by a few women in the west of London in 1851, but was ridiculed and soon discarded. It led the way, however, to the modern use of knickerbockers and the divided skirt for cycling and climbing.

Bloomfield, tn., Essex co., New Jersey, U.S.A., 12 m. n.w. of New York, on Erie and Lackawanna Railroad and Morris Canal. Its chief educational institution is the German Theological Seminary. It is partly a residential place, but manufactures woollens and rubber goods and boots and shoes. Pop. 12,000. See Shaw's *History of Essex and Hudson Counties, New Jersey* (1884).

Bloomfield, ROBERT (1766-1823), English poet, born in Suffolk, was first an agricultural labourer, and then a shoemaker in

London. During a short residence in the country in 1786 he conceived the idea of his poem *The Farmer's Boy*, written under melancholy circumstances in a London garret, and published in 1800. It is an estimable though much overpraised work, and was so successful that close on 26,000 copies were sold in three years. He died in poverty and mental darkness. A collected edition of his works, with Life by Joseph Weston, appeared in 1824.

Bloomington. (1.) City, Illinois, U.S.A., the co. seat of McLean co.; situated in the central part of the state, 60 m. N.E. of Springfield. It is the seat of Illinois Wesleyan University (1852); the State Normal University is at Normal, 2 m. distant. The manufactures include machine-shop and foundry products, bricks and tiles. Pork-packing and fruit-canning industries are important. Pop. 26,000. **(2.)** Town, Indiana, U.S.A., cap. of Monroe co., 50 m. s.s.w. of Indianapolis; is the seat of Indiana University, founded in 1828. It has large limestone quarries, and manufactures furniture and woollen goods. Pop. 9,000.

Bloomsburg, tn., Pennsylvania, U.S.A., co. seat of Columbia co., 35 m. s.w. of Wilkesbarre, on l. bk. of the N. branch of the Susquehanna R. There are foundries and blast furnaces, and furniture, woollen, silk, and flour factories. Pop. 6,200.

Bloomshury, part of eccles. par. of St. Giles-in-the-Fields and St. George, London, England.

Blore, EDWARD (1787-1879), English architect, son of Thomas Blore (1764-1818), Derby, whose *History of Rutland* (1811), as well as Britton's *English Cathedrals* (1811-15), he illustrated. He did much to revive the study of Gothic architecture. Among the numerous buildings designed by him the chief was Abbotsford. He was the

author of *Monumental Remains of Noble and Eminent Persons* (1824).

Blore with Swinscoe, par. and small vil., on the Dove R., N. Staffordshire, England, 4 m. N.W. of Ashborne. On the heath was fought the second battle of the wars of the Roses in 1459.

Blouet. See MAX O'RELL.

Blount, CHARLES, EARL OF DEVONSHIRE AND EIGHTH BARON MOUNTJOY (1563-1606), served in Netherlands, in pursuit of the Armada, and in Brittany (1586-93), and was lieutenant of land forces in Essex's expedition to the Azores (1597). He was implicated in Essex's conspiracy, but escaped punishment. When lord-deputy of Ireland (1601) he put down Tyrone's rebellion. M.P. for Beeralston (1581, 1586, and 1593); K.C. (1597); created Earl of Devonshire (1603).

Blount, CHARLES (1654-93), English deist, was a disciple of Hobbes, and the author of several freethinking works. His *Anima Mundi* (1679) is a history of opinions concerning immortality. Priestcraft is attacked in *Diana of the Ephesians* (1680), and in the better-known translation, with notes, of *The Two First Books of Apollonius Tyaneus* (1680).

Blount, THOMAS (1618-79), English miscellaneous writer, born at Bordesley; was educated for the law, but, being a Roman Catholic, did not practise. He was the author of the *Academic of Eloquence* (1654); *Bosobel*, in two parts (1660 and 1681); *Law Dict.* (1670); *Ancient Tenures and Jocular Customs of some Manors* (1679; new ed. 1815).

Blow, JOHN (1648-1708), English musical composer, became organist of Westminster Abbey in 1669, and was successively master of the children at the Chapel Royal (1674) and St. Paul's Cathedral (1687-98). In organ-playing his contemporaries reckoned him to be unequalled. He was a pro-

lific composer of ecclesiastical music. He wrote incidental music for several occasions, notably the anthems, *I was glad* (for the opening of St. Paul's Cathedral), and *Behold, how good and joyful* (for the union with Scotland). Several of his pieces have been republished in Pauer's *Dict. of Pianists and Composers* (1877).

Blow-fly. See BLUE-BOTTLE.

Blowing Machines, mechanical contrivances for the production of a current of compressed air. Their use is as varied as their form, but they are chiefly employed to produce the blast for metallurgical and forced draught for boiler furnaces, to displace vitiated air in close and foul places and in mines, to supply warmed, cooled, or purified air to public buildings, and to furnish a drying current of air to lumber, grain, fabrics, and other articles, or to remove steam, dust, and refuse from factories. The most elementary blowing machine is the common bellows of domestic use, which was also used from time immemorial for metallurgy, until the blowing cylinder with reciprocating piston was devised. Blowing cylinders worked by direct acting steam-engines and gas-engines are now in general use to produce a blast of from two to five pounds pressure per square inch, according as the fuel is tender or hard; in American anthracite furnaces pressures up to ten pounds are employed. For low pressures and large volumes of air, fans and rotary blowers, often driven directly by steam-turbines, are preferred.

A modern blowing cylinder (Fig. 1) is fitted with a piston usually coupled direct to the reciprocating piston of the steam-engine. Air is drawn into one end of the cylinder through a flap-valve in the cylinder cover while the piston makes its out-stroke, and at the same time the air at

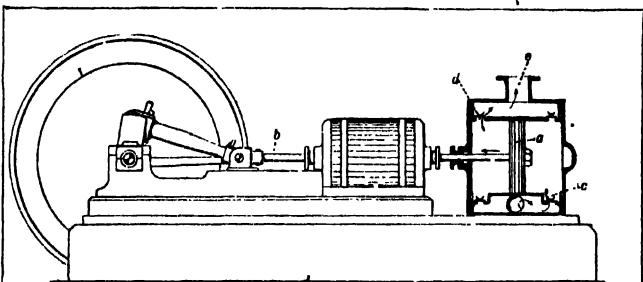


Fig. 1

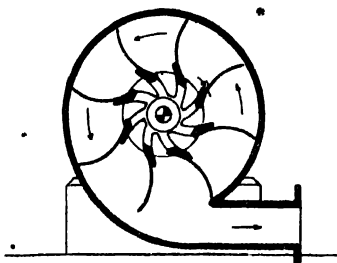


Fig. 2

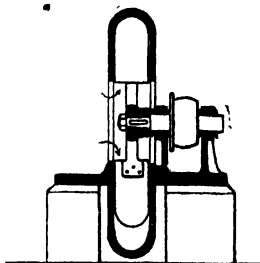


Fig. 3

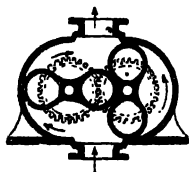


Fig. 4

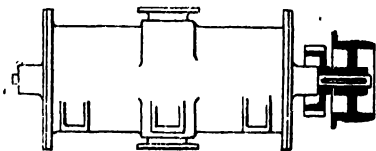


Fig. 5

Blowing Machines.

Fig. 1. Blowing cylinder—*a*, piston, *b*, piston rod of steam-engine; *c*, air inlet valve; *d*, outlet valve; *e*, blast main. Fig. 2. Centrifugal fan, side elevation (section); Fig. 3, end elevation (section). Fig. 4. Root's rotary blower (section); Fig. 5, elevation.

the other side of the piston, drawn in at the previous in-stroke, is expelled under pressure through a flap-valve at the other end of the cylinder into the blast main, to be passed through the hot blast stoves before reaching the blast furnace.

Centrifugal fans (Figs. 2, 3) are employed either as compressing machines drawing their air supply from the atmosphere, or as exhaust fans displacing air for ventilating purposes. The air enters through apertures on one or both sides of the casing in the axis of the fan; thence it is driven towards the periphery by means of curved arms fitted on a rotating hub, and discharged through an opening in the casing. When pressures exceeding six inches of water are required, Roots's rotary blower (Figs. 4, 5) may be employed. It consists of a casing in which two 'rollers,' shaped in section like the figure 8, are centred on parallel axes, and are driven by a pair of equal spur-wheels in opposite directions at about 300 revolutions per minute. The rollers and casing have very little clearance, and the air is really scraped out of the casing on one side and delivered on the other. See VENTILATION.

Blowitz, HENRI GEORGES STEPHAN ADOLPHE OPPER DE (1825-1903), Paris correspondent of the *Times* during a period of thirty years, was born at the château of Blowsky, in Bohemia, and baptized a Catholic. At the age of twenty he was introduced at Paris to M. de Falloux, minister of public instruction. Shortly afterwards Blowitz received the offer of a professorship of modern languages in Angers. He subsequently occupied a similar post in Marseilles. He shortly afterwards retired from the teaching profession and took to politics. On the establishment of the republic in 1870 he obtained letters

of naturalization. He supplied Thiers with information which enabled him to crush the commune in the south of France, and as a reward he was nominated for the post of consul at Riga. He was appointed chief correspondent of the *Times* in 1873, and the thirty years which intervened between this date and his retirement were crowded with brilliant journalistic achievements. On Dec. 31, 1873, he telegraphed particulars of the *coup d'état* in Spain, which he had obtained by actually interviewing in Paris the newly-proclaimed king, Alfonso XII. Two years later he exposed the designs of the military party in Germany for a fresh attack on France, and war was averted. He obtained a copy of the treaty agreed to at the Berlin Congress in 1878, and telegraphed its preamble and sixty-four articles to the *Times* before it was actually signed. The name of the plenipotentiary who gave him the treaty has never been divulged. It was Blowitz who first announced that the Russians were going to Merv. The news was contradicted by the Russian government, but the prophecy was realized within six months. During his connection with the *Times* he interviewed Bismarck, Thiers, Gambetta, King Humbert, Pope Leo XIII., the Sultan of Turkey, the Shah of Persia, and many other notabilities. His *Memoirs* were published in 1903.

Blowpipe, an instrument used by glass-blowers, in analytical chemistry, and in the soldering of metals, for directing and increasing the rapidity of combustion of a flame. In its simplest form it consists of a tapered metal tube fitted with a mouthpiece; from the side projects a narrow tube provided with a nozzle of brass or platinum. By holding the point of the side tube into a candle or gas flame, and blowing a gentle current of air from the mouth,

the flame is deflected, and an intensely hot, pointed jet is obtained. Larger blowpipes are made in various patterns, the air being supplied from a foot-bellows, and the supply of gas and air regulated by taps. See C. F. Plattner's *Blowpipe Analysis* (1875); W. A. Shenstone's *Methods of Glass-blowing* (2nd ed. 1888); and Dolas's *Glass-blowing and Working* (1898).

Bloxwich, eccles. par. and vil., Staffordshire, England, 2 m. N.W. of Walsall, on L. & N.W.R. In the vicinity are coal and iron-stone mines and blast-furnaces. Pop. of par. 18,000.

Blücher, GEBHARD LEBERECHE VON (1742-1819), Prince of Wahlstatt, field-marshal of Prussia, was born at Rostock, and entered first the Swedish service, then the Prussian (1760). In 1772 he left the army and farmed his own lands until the accession of Frederick-William II. (1787). After being present in many actions (e.g. Kaiserslautern) against the French, he commanded the cavalry at Auerstädt in 1806, and was compelled to surrender after the fall of Lübeck (1806), but was soon after exchanged for the French general Victor. In 1813 Blücher received the chief command in Silesia, operating against the French at the battles of Lützen, Bautzen, and Haynau. He defeated Marshal MacDonald at the Katzbach in Aug. 1813, Marmont at Möckern (Oct. 16), and three days later made his victorious entry into Leipzig, and was raised to the rank of field-marshal. In January 1814 he crossed the Rhine, and won the battle of La Rothière, but was soon afterwards defeated by Napoleon. This reverse, however, was quickly wiped out by his victory over Napoleon at Laon on March 9; and after again inflicting a severe defeat on the French at Montmartre, he

marched in triumph into Paris. After Napoleon's return from Elba in 1815, Blücher was appointed commander-in-chief of the Prussian army. At Ligny, on June 16, he was defeated after a stubborn action; but he rallied his scattered troops, and moved to the assistance of Wellington at Waterloo. This impending flank attack on the French contributed greatly to the completeness of Wellington's victory, if indeed it was not the chief cause of it, and Blücher was in time to participate in the pursuit. On the second taking of Paris, Wellington had great difficulty in preventing Blücher from sacking the capital, which the latter held to be a justifiable retaliation for the sacking of other capitals by the French. He received the order of the Iron Cross (established 1813) from Frederick-William III. Rauch's noble statue of the veteran was erected (1820) at Breslau. Blücher's intrepidity and warlike fervour gained him the appellation of 'Marshal Vorwärts' (Go ahead), but he was not a great military strategist or tactician. He was characterized by patriotism, loyalty, and integrity, and by uncompromising hatred of Napoleon. Although rough in manner, he was idolized by his troops. See *Lives*, by Förster (1821; new ed. 1887), Scherr (1862), Varnhagen von Ense (in vol. iii. of *Biographische Denkmale*, 1827); also the various histories of the Waterloo campaign.

Bludenz, tn., Vorarlberg, Austria, 18 m. S. by E. of Dornbirn. It is a much frequented tourist resort. Pop. 5,500.

Blue. The blue pigments and dyes in most general use are ultramarine, cobalt blue, indigo, and Prussian blue, in addition to the large number of compounds made from coal-tar products. Laundry blue is made of ultramarine, 60 parts; bicarbonate of

soda, 40 parts; glucose, 12 parts. Grind the two first together, mix in the glucose, and press in moulds. Liquid laundry blue may be made as follows:—Indigo or Prussian blue, 8 lbs.; oxalic acid, 1 lb.; water, 32 gallons.

Bluebeard, hero of the fairy tale, and type of savage husbands. The English version is a rendering of Perrault's *Barbe-Bleue* (in his *Contes*, 1697). Bluebeard is the subject of an *opéra bouffe* by Offenbach (1866). See also Anatole France's *Les Sept Femmes de la Barbe-Bleue* (1909).

Bluebell, a name applied to two plants—the wild hyacinth (*Scilla nutans*), which flowers in woods in spring; and the harebell (*Campanula rotundifolia*), which flowers during summer in pastures and on hills. The latter is the 'bluebell of Scotland.'

Bluebird (*Sialia Wilsoni*), a common N. American bird belonging to the thrush family. In the New England States it is known as the blue robin. The name is also applied to the Indian *Irena puella*, a member of the family Pycnonotidae. See John Burroughs's *Wake Robin* (1871).

Blue Books, a general term for official reports of the British Parliament and the Privy Council, usually bound in blue paper covers, containing the votes and proceedings of the House, bills at their successive stages, annual estimates for the public service, accounts of the expenditure of the previous year's votes, documents tabled by the ministry voluntarily or on demand of the House, reports of government commissions, annual reports of governors of colonies and consuls, etc. One session's blue books will fill from 80 to 130 folio volumes. The printing of the proceedings of the House dates from 1681, and the selling of its blue books from 1836. Properly speaking, the only blue books are those

in blue paper covers. Votes and proceedings of the two Houses, bills, etc., are unbound, and are known as 'Parliamentary Papers.' Estimates, trade returns, etc., are 'white papers.' Certain annual reports, like those of the Labour Department of the Board of Trade, are in buff. Many blue books, such as consular reports, are octavo, not folio. In imitation of the blue book, Germany has established its gray or white book, first communicated (1884) to the Imperial Parliament. In France, the corresponding colour is yellow; in Spain and Austria, red; in Italy, green; and in the United States of America, both blue and red.

Blue-bottle, or BLOW-FLY (*Calliphora vomitoria*), an insect nearly related to the common house fly, but differing in its larger size, its bright blue abdomen, and its deep humming note. The eggs are laid in meat, especially if putrefaction has commenced—the flies being strongly attracted by decomposing matter of any kind—and hatch into maggots, which pass through the usual life-history of flies. In certain parts of England, especially the fens round the Wash, they are a source of constant trouble to the owners of sheep during the warm months, the maggots frequently penetrating the skin.

Blue-coat School. See CHRIST'S HOSPITAL.

Blue-eye, a name given to an Australian bird, *Entomyza cyanotis*, one of the honey-eaters.

Bluefields, or BLEWFIELDS, riv. and tn., on E. ct. of Nicaragua, Central America. The river has a course of about 100 m., and is navigable for 60 m. The harbour of Bluefields is one of the finest in Central America, lat. 12° N. Pop. of tn. about 5,000.

Blue-fish (*Temnodon saltator*), also called 'skip-jack,' is a widely-

distributed fish belonging to the family of the horse-mackerels. It is especially common on the coasts of N. America, where it is much used as food. It may attain a length of three feet, but is usually less, and is a most rapacious fish.

Blue-gowns, or **KING'S BEDESMEN**, public almsmen in Scotland to whom the kings distributed bounty, in return for which they were expected to pray for the welfare of king and state. The appointment of blue-gowns ceased in 1833, and the last allowance to a blue-gown was made in 1863. See Introduction to Scott's *Antiquary*.

Blue Grass, **JUNE GRASS**, or **SPEAR GRASS** (*Poa pratensis*), a valuable permanent pasture grass, known in Britain as smooth meadow grass, and in N. America as the 'blue grass of Kentucky.' The blue grass region is the scene of most of the novels of Mr. James Lane Allen. A similar species, Texas blue grass (*P. arachnifera*) takes its place in the southern states.

Blue Island, tn., Cook co., Illinois, U.S.A., 12 m. s. of Chicago, of which it forms a suburb. Pop. 6,000.

Blue John Mine, chambered cave, N. Derbyshire, England, 1½ m. w. of Castleton, producing the nodular purple fluorspar known as Blue John.

Blue Mountains. (1.) Well-wooded (chiefly with eucalyptus) range of mountains in New South Wales, extending from the Warragong Mts. (or Australian Alps) on the s.w. to the Liverpool Range on the n., approaching to within 40 m. of the coast. In places the spurs run down to the shore. Average a't. 3,000 ft. See Argus's *The Jcnolian Caves and the Blue Mountains* (1898). (2.) Mountain group in Oregon, U.S.A., trending nearly N. and s., in the E. part of the state; alt. from 5,000 to 9,000 ft. It is

chiefly composed of lava, with granite in the higher portions. (3.) Mountain range in E. of Jamaica, running from E. to w., and culminating at 7,423 ft. (4.) Range, Pennsylvania. See **KITTATINNY**.

Blue Nile. See **NILE**.

Blue Peter, in the British navy, the blue flag with white square in the centre, denoting the letter P in the alphabetical signal code; hoisted at the fore to show that a ship is about to put to sea.

Blue Pill, or *Pilula hydrargyri* of the British Pharmacopoeia, contains free mercury in the proportion of one part in three, with liquorice and confection of roses. It is a common purgative, acting probably by irritation of the intestinal mucous membrane, and resulting in peristalsis and a watery exudation. It hastens the evacuation of bile, but does not increase the amount secreted by the liver. Its action is commonly aided by the after-use of some saline draught.

Blue Ridge, range of the Appalachian Mts. lying nearest to the Atlantic coast. It is highest in Virginia and N. Carolina, and is traced from the comparatively low headlands of West Point, New York, into Alabama.

Blue Shark (*Carcharias glaucus*), a common shark, which sometimes reaches a length of 25 ft., though from 12 to 15 ft. is the usual size. Most abundant in tropical seas, its range extends northwards to the south coast of England.

Bluestocking, a term applied contemptuously to a female pedant. It originated in connection with certain reunions held in London about 1780 by Johnson's friend, Mrs. Montagu, and other ladies. Hannah More addressed to them her poem of *Bas-Bleu*, or *Conversation* (2nd ed. 1787).

Blue Suns. After the great eruption of Krakatoa on Aug. 27,

1883, blue, green, silvery, and coppery suns were seen at many places in the tropics, the phenomenon being attributed to a dust haze which proceeded from the neighbourhood of the volcano. Some maintain that the appearances were merely the effect of contrast colours, while others refer them to the transmission or the diffraction of light. Professor Kiessling produced experimentally transmission tints varying from brownish red to gray-blue, obtaining the blue sun both with a cloud of chloride of ammonium and with aqueous vapour mixed with ordinary dust. See Synnond's *Eruption of Krakatoa, and subsequent Phenomena* (1888). See also BISHOP'S RING.

Bluthroat (*Cyanocitta suecica*), a beautiful bird allied to the redstart, which is an occasional visitor to Britain. It is also called the 'Swedish nightingale' and the 'bluebreast;' while to epicures it is one of the birds known as beccatoo or boefin. It breeds in N. Europe, Siberia, Alaska, etc., and winters in Abyssinia and India.

Blum, HANS (1811), German jurist and historian, born at Leipzig. He was a member of the North German Parliament from 1867-70, and has written several works on jurisprudence and on the contemporary history of Germany, as *Auf dem Wege zur Deutschen Einheit* (3 vols. 1893), *Das Deutsche Reich zur Zeit Bismarcks* (1893), *Fürst Bismarck und seine Zeit* (6 vols. 1894-5), *Persönliche Erinnerungen an den Fürsten Bismarck* (2nd ed. 1900), *Spannende Geschichten* (1902), *Ueberhande* (1904), *Eigene Lebenserinnerungen* (1907), etc.

Blum, ROBERT (1807-48), German politician, born at Cologne. He helped to found (1840) at Leipzig the Schiller Society, and (1847) a publishing house from which he issued his *Staatslexikon*. Democratic leader in the revolu-

tion of 1848, he represented Leipzig in the Frankfurt Parliament. Sent by the Left with a congratulatory address to the insurgents of Vienna, he led them at the barricades, but was taken prisoner and shot (Nov. 9) for having assumed arms against the imperial troops. The news excited the liveliest indignation throughout Germany, where £3,000 was raised for his widow and children. See his *Life*, by H. Blum (1878).

Blumenau, German colony (founded 1850) and tn. in state of Santa Catharina, Brazil, about 30 m. W. of Itajahy. Corn, tobacco, sugar-cane, coffee, rice, etc., are extensively cultivated. Pop. 30,000.

Blumenbach, JOHANN FRIEDRICH (1752-1840), German naturalist, born at Gotha. Appointed (1776) professor at Göttingen, he there lectured for nearly sixty years on natural history, anatomy, and medicine. In 1785 he discerned, before Cuvier, that the true basis of zoological study is comparative anatomy, a science which he elaborated in *Handbuch d. vergleichenden Anatomie u. Physiologie* (1804; new ed. 1824). Devoting himself particularly to the history of man, he advocated the unity of the race, and made a collection of human skulls, supplying data for his *Collectio Craniorum Diversarum Gentium* (1790-1828). Original observations are also embodied in his *Ueber den Bildungstrieb* (1781), *Institutiones Physiologicae* (1787; new ed. 1821), *De Genere Humani Varietate Naturæ* (1795), etc.

Blumenthal, JACQUES (1828-1908), musical composer, was born at Hamburg, and educated in Vienna and Paris but became a naturalized British subject, having lived in England since 1848. He is best known as a song-writer, his *The Message*, *Requital*, *My Queen*, etc., having had considerable popularity.

Blumenthal, LEONHARD, COUNT VON (1810-1900), Prussian general. Appointed on the general staff in 1849, he distinguished himself in Schleswig-Holstein in the same year; took part as chief of the staff in the campaign against Denmark (1864); served as chief of the staff to the Crown Prince of Prussia in the Austrian campaign of 1866; and in the war with France (1870-1) he again acted as chief of the staff to the Crown Prince Frederick, and took part in the surrender at Sedan and in the siege of Paris. Created a field-marshal by the Emperor Frederick in 1888. See *Journals of Field-Marshal Count von Blumenthal* (Eng. trans. 1902).

Blumenthal, OSKAR (1852), founder and manager of the Lessing Theatre (1888-97) in Berlin, and author of a number of light and popular comedies, such as *Der Probezeit* (1882), *Die Grosse Glocke* (1887), *Im weissen Rüssel* (1898). He has also written light satirical works, as *Allerhand Ungezogenheiten* (1874; 5th ed. 1877), *Gemischte Gesellschaft* (1877), *Aus heiterm Himmel* (1882), *Der Blinde Passagier* (1902), *Wann wir Altern* (1903), *Das Glashaus* (1906), etc.

Blunderbuss, a short gun, unrifled, and with a large bore, widening towards the muzzle, firing many balls or slugs, which scattered when fired, and were effective within a limited range without exact aim being taken. It has long been obsolete.

Blunt, JOHN HENRY (1823-84), English writer of theological and ecclesiastical books. Taking orders in 1852, he was presented with the crown living of Beverstone, in Gloucestershire, in 1873. He published *Annotated Book of Common Prayer* (1866), *Hist. of the Reformation* (1868), *Dict. of Theology* (1870), *Dict. of Sects and Heresies* (1874), and *Cyclopædia of Religion* (1884).

Blunt, JOHN JAMES (1794-1855), professor of divinity in Cambridge from 1839, is best known by his *Sermons*, and by his apologetic works, reissued as *Undesigned Coincidences in the Writings both of the Old and the New Testament* (1847). His *Hist. of the Christian Church during the First Three Centuries* (1856), and his lectures *On the Right Use of the Early Fathers*, were published after his death.

Blunt, WILFRID SCAWEN (1840), English poet, born at Petworth House, Sussex; served in the British diplomatic service from 1858 to 1870. His wife, Lady Anne Blunt, is a granddaughter of Lord Byron. Blunt upheld the cause of Arabi Pasha in Egypt in 1882, and in 1887-8 took part in the anti-coercion movement in Ireland, for which he suffered imprisonment. He resides for part of each year in Egypt. He is a poet of a high order. His works include *Love Sonnets of Proteus* (1880); *The Future of Islam* (1882); *The Wind and the Whirlwind* (1883); *Ideas about India* (1885); *In Vinculis* (1889); *A New Pilgrimage* (1889); *Esther* (1892); *Griselda* (1893); *Satan Absolved* (1899); *Seven Golden Odes of Pagan Arabia* (1903); *Secret History of the English Occupation of Egypt* (1907); and *India under Ripon* (1909). A useful selection of his *Poems* was made by W. E. Henley and G. Wyndham in 1898.

Bluntschli, JOHANN KASPAR (1808-81), Swiss jurist, born at Zürich. Professor at Zürich (1833), he published (1838-9) *Staats- und Rechts-geschichte der Stadt u. Landschaft Zürich*, the tenor of which conforms with the principles of the historic school. In 1848 he was called to a law chair at Munich. His *Allgemeines Staatsrecht* (1852; 5th ed. 1875-6), translated into English (1885; 2nd ed. 1892) and French (1877),

established his authority as a jurist. From 1861 professor at Heidelberg, and at the front of liberal movements, he co-operated in the foundation of the German House of Representatives (1862), and induced (1865) the upper house to submit voluntarily to reform. No less zealous for religious freedom, he was one of the most active members of the German Protestant Union. Bluntschli wrote several other books on German and Swiss law, politics, and history (e.g. *Geschichte der Republik Zürich*, 1847-56). His *Selbstbiographie* (3 vols.) appeared in 1884.

Blushing is a reflex dilatation of the blood-vessels of the face and neck, due to vasomotor paralysis through the cervical sympathetic nerve, acted upon by the higher cerebral nerve centres, their action being initiated by the emotions of shame, bashfulness, timidity, and the like. The phenomenon is not fully understood.

Blyth, sept., mrkt. tn., and eccles. par., 9 m. S.E. of Morpeth, Northumberland, England; engaged in coal export trade. Pop. 30,000.

Boa, a genus of very large snakes, confined to tropical America, and without poison fangs. Their great size (10 to 11 ft.) and strength enable them to crush their prey to death by coiling the pliant body round the victim. The habit has long been rendered familiar by descriptions of the boa constrictor. The process of digestion is long and laborious, and is aided by a copious discharge of saliva. Together with the anacondas (*Eunectes*) and the pythons, the boas are included in the family Pythonidae. The anaconda is an aquatic boa, said to reach 30 ft. in length. See PYTHON.

Boabdil, more correctly ABU ABDALLAH, last Moorish king of Granada. Rebelling against his father (1481), and then warring

against his uncle, he so reduced the strength of the Moors that he had to surrender Granada to Ferdinand of Aragon (1492). Crossing (1493) to Africa, he fell fighting in the service of the king of Fez.

Boac, tn., on w. coast of the small isl. of Marinduque, Philippines. Pop. 15,000.

Boadicea, queen of the Iceni in Britain, who inhabited Suffolk and Norfolk. The outrages of the Romans (60 A.D.)—two of her own daughters had been ravished—caused her to head an insurrection during the absence of Suetonius Paulinus, the Roman governor, in Anglesey. She succeeded so far as to capture the towns of Camulodunum (Colchester) and Londinium, killing 70,000 Romans and their allies. But Suetonius, on his return, defeated the Britons with great slaughter, and the queen put an end to her life (62 A.D.). This victory secured the Roman dominion in Britain. See Tennyson's *Boadicea*, Cowper's ode with the same title, and Tacitus's *Annals*, xiv. 31-37.

Boanerges, a name given by Jesus, in Mark 3:17, to the disciples James and John, the sons of Zebedee, and interpreted by the sacred writer as 'sons of thunder;' hence sometimes applied to a man of strong and vehement character.

Boar, or WILD BOAR (*Sus scrofa*), a mammal once common in the British Isles, and still found in many parts of Europe, Asia Minor, India, and N. Africa. It is believed to be the original of the domestic pig, from which it differs in certain minor points. The body is covered with long, stiff bristles, beneath which there is a softer curling undercoat, which is uniform in tint in the adult, while the young are striped. In the swamps which it usually haunts the boar is prevented

from sinking in the mire by its broad spreading feet; on dry land it uses only the two median toes in walking, the lateral ones being too short to reach the ground. As is indicated by the generalized character of the teeth, the hoar is practically omnivorous, though it depends largely upon roots, bulbs, and tubers, which are dug up by the sensitive snout with the help of the tusks. In the male the canines or dog-teeth are greatly developed, and make the animal a dangerous adversary when at bay. Zoologically the hoar is of great interest, as being one of the most generalized of living even-toed ungulates, and as retaining the marshy habitat of the ancestral ungulates. Its unspecialized nature is shown especially in the number and structure of the teeth, of which it has forty-four, in the number (4) of the complete toes and the structure of the limbs, and in the simple nature of the stomach (contrast sheep and cow). See also FIG.

Board of Trade Unit, or B.T.U., is the commercial unit of electrical supply, and equals 1,000 watt-hours. It is equal to 1.34 h.p. working for one hour, as 746 watts = 1 h.p. The number of B.T.U.'s received in an hour is the product of the volts and amperes divided by 1,000.

Boards of Agriculture, Education, Trade, Works, etc. See AGRICULTURE, EDUCATION, TRADE, WORKS, etc.

Boar-fish, a name applied to two distinct fish—(1) to an Australian food-fish (*Histiogaster recurvirostris*) belonging to the perch family, and (2) to the Mediterranean *Capros aper*, one of the horse-mackerels, which occasionally appears off the British coast.

Boat, a term now indiscriminately used for sea and river vessels of all kinds, but more

properly applied to a vessel that can be hauled up on or launched from a beach. It may be propelled by oars, sails, steam, or other motive power. From the earliest ages men have used buoyant contrivances to float them across streams and lakes. The primitive log or number of logs lashed together to form a raft, or bundles of brushwood or reeds used for the same purpose, early developed into the parent of modern boats, the dug-out, which has been found in association with Stone Age remains and in Swiss lake dwellings. Bark canoes and wickerwork frames covered with skins, such as the coracle of the ancient Britons, are a further development. The catamaran clearly exhibits its connection with the raft, so modified as to afford less resistance to the water. The art of boat-building began when men first lashed together pieces of wood with thongs, sinews, or fibres into a serviceable shape. For modern methods of boat-building see SHIP-BUILDING. Every kind of primitive boat may still be seen in use somewhere or other in the world. The coracle, for example, is still found on certain Welsh streams. Modern boats are of many kinds, according to the purposes for which they are intended and the character of the waters on which they are to sail. They are usually classed for racing purposes as open, half-decked, and decked boats. The canoe, punt, skiff, gondola, dingy, and outrigger are used on smooth water for pleasure and racing. The boats used by watermen vary greatly, according to the locality. On the Thames the wherry or skiff is used; on the north-east coast of England the coble, which is furnished with a dipping lug-sail. Larger and more powerfully built boats are used by fishermen. The ordinary canal boat, the Thames

barge, and the Norfolk wherry are used for freight; the former is usually towed, the two latter have sails. Whale boats are sharp at both ends, and are steered with an oar. Lifeboats are provided with air chambers, which render them self-righting or self-bailing, or both combined. The following boats are used in the royal navy for rowing and sailing: barge, pinnace, cutter, lifeboat cutter, galley, gig, jolly-boat, and dingy. Steam launches, pinnaces, and cutters are also employed. The Board of Trade requires every sea-going ship to carry a specified number of boats, according to the tonnage. Sea-going ships carrying passengers must carry a lifeboat, and have sufficient boat accommodation for all the passengers and crew carried. Among collapsible boats the Berthon is at once the most efficient and the most popular. The high-speed motor boat is chiefly a development of the past four or five years. See also YACHT, SUBMARINE NAVIGATION, MOTOR BOAT, and separate articles on the types mentioned above.

Boatbill, or **BOATBILLED HERON** (*Cacronema cochlearia*), is a S. American night-heron, remarkable for its broad head ending in the peculiar flattened bill to which it owes its name. The birds occur especially in the woods bordering the rivers of Brazil, and feed upon worms and aquatic organisms. See **HERON**.

Boat-fly, or **WATER-BOATMAN** (*Notonecta*), an insect belonging to the same group as the bug (Hemiptera-Heteroptera), but living entirely in the water. It is peculiar in that it always swims back downwards, and is exceedingly common in ponds, where it may be seen rising to the surface to breathe.

Boat Race. See **ROWING**.

Boatswain, a warrant-officer in the Royal Navy. The term is de-

rived from 'boat's swain,' or husband. According to Sir Harris Nicolas's account of the 'bus-carles,' every ship was anciently in charge of a 'batsuen,' who commanded her crew in action, and acted at all times as master-pilot or steersman. The office of boatswain, although long in use, received recognition for the first time when the navy was increased in the 16th century. The duties attached to the office were to take charge of the boats, sails, rigging, colours, anchors, cables, and cordage, and also to summon the crew to their duty, and to assist in the necessary business of the ship. He has always used for this purpose a whistle, which he to some extent has token of office. Boatswains were anciently appointed by warrant from the Navy Board. At the present day the qualification necessary for a boatswain is that he must have been seven years at sea, and have served one complete year as a petty officer, either as seaman, gunner, or seaman torpedo man, and be between the ages of twenty-one and thirty-five. Chief boatswains are promoted from boatswains as the Admiralty may see fit. For exemplary conduct, or for distinction by acts of gallantry, these selected boatswains receive, after examination, a commission, on obtaining which they are given a gratuity of £100 for outfit. See *The King's Regulations and Admiralty Instructions*.

Boavista, or **BUENAVISTA**, the second largest of the Cape Verde Islands, with three ports—Porto Sal Rey on the W., Porto do Norte on the N.E., and Porto Curralinho on the S.E. Pop. 5,000.

Boa Vista, the name of several towns and villages in Brazil, the principal of which are: in the state of Maranhao, on the Rio Tocantins; in the state of Amazonas, on the Rio Branco, also

on the Rio Purus; in the state of Pernambuco, on the Rio San Francisco; and in the state of Santa Catharina, 230 m. s.w. of Curitiba.

Boaz, the name of one of the two brazen pillars at the porch of Solomon's temple, Jerusalem (1 Kings 7:21); the other was called Jachin.

Boaz, a man of Bethlehem, married Ruth, a Moabitess, and their son Obed was the grandfather of David. See Ruth; 1 Chron. 2:12-15; Matt. 1:6.

Bobbil, tn. in the Bobbili Estate (area, 1 sq. m.), Vizagapatam dist., Madras, India. The town is one of the most ancient in the presidency. Pop. 17,000.

Bobbins, wooden rollers with axial perforation by which to place them on a spindle, and flanged at each end. It is on bobbins that yarn is wound. In throstle-spinning the bobbins receive the threads of wool, cotton, etc., from the drawing rollers. The largest bobbins are used for the slubbing frames, where, from the lap shape in which it comes from the carder, the cotton passes into a loose strand. The most familiar form of bobbin is the pirn or spool of sewing-thread. Metal bobbins are used for lace-making. Paper tubes are now largely taking the place of bobbins.

Bobbio, tn. and episc. see, prov. Pavia, Italy, on the Trebbia, 26 m. s.w. of Piacenza. Near it, in 612, St. Columbanus founded an abbey, which possessed a famous collection of historical mss., now in the Vatican and the Ambrosian Library, Milan. There is an old cathedral. Pop. 5,000.

Bober, riv., Silesia, Germany, rises on the Bohemian frontier in the Riesengebirge, and flows in a n.w. direction past Bunzlau and Sagan, joining the Oder at Krossen after a course of 150 m.

Böblingen, tn., Württemberg, Germany, in the Neckar circle,

16 m. by rail s.w. of Stuttgart; manufactures sugar and chemicals, and cultivates hops. Here, in 1525, Truchsess von Waldburg defeated the insurgent peasants with heavy loss. Pop. 5,700.

Bobolink, or RICE-BUNTING (*Dolichonyx oryzivorus*), a N. American bird, famous for its song, powers of flight, and especially for the flavour of its flesh. It is related both to the buntings and to the family Icteridæ.

Bobrek, tn., Prussian prov. of Silesia, 3 m. w. by s. of Beuthen; with coal mines and zinc and iron works. Pop. 6,000.

Bobrinets, tn., Russia, gov. of and 120 m. N. of Kherson city, on an affluent of the Bug. Tobacco manufacture. Pop. 15,000.

Bobruisk, tn., Minsk gov., Russia, till 1897 a strong fortress (besieged by the French in 1812), on Berezina, 103 m. by rail s.e. of Minsk. Pop. 35,000.

Bocage, MANOEL MARIA BARBOSA DU (1765-1805), Portuguese poet, born at Setúbal; entered first the navy, where he remained until 1790, and after that devoted himself to literature. Bocage is, after Camoens, the most popular Portuguese poet. He wrote in every genre of poetry, but excelled in the sonnet, some of his being among the best in the Portuguese language. His liberal ideas brought him several times into trouble with the Inquisition. His works appeared under the title *Rimas* (1806-14); later, under the title *Obras Poéticas* (1875, 1876). See Braga's *Bocage, sua Vida e Epoca Literária* (1877).

Bocas del Toro, prov. of Panama, in the extreme n.w., the principal banana-producing prov. Pop. 22,000. The cap., Pocos del Toro, is situated on an island in Almirante Bay. Imports are valued at £1,750,000, and exports (mainly bananas and nuts) at £300,000 per annum. Pop. 6,000.

Bocoue, tn., Bulacan prov., Luzon, Philippine Is., 15 m. N.W. of Manila. Sugar and rice are cultivated. Pop. 10,000.

Boccaccio, GIOVANNI (1313-75), great Italian writer and humanist, was born at Paris, the natural son of a Florentine merchant. In 1334 (or 1338) he fell in love with Maria d'Aquino, a natural daughter of King Robert of Naples. This passion directly or indirectly inspired the poet to the composition of a number of works—the *Rime*, *Filocolo*, *Filostrato*, *Teseide*, *Amorosa Visione*, and *Fiammetta*. In 1340 he was recalled to Florence by his father. From 1345 to 1347 he dwelt in the Romagna, till, in 1349, his father's death compelled him again to return to Florence. In 1350 he entertained as his guest Petrarch, with whom he formed a close friendship. In 1359 Petrarch endeavoured to influence Boccaccio's religious feelings, and three years later a priest, Gioacchino Ciani, effected a complete change in his moral views and conduct. In 1363 he withdrew to Certaldo (near Florence), where he passed the remainder of his life, except for embassies to Avignon (1365) and to Rome (1367), a visit to Petrarch (1368), and the Dante lectures which he delivered at Florence.

The list of his works in verse is headed by the *Rime*, mostly composed between 1334 and 1348 (a good ed. by Baldelli, Leghorn, 1802). The *Amorosa Visione* (c. 1342; 1st ed. Milan, 1521) is outwardly, in metre and framework, imitated from the *Commedia*. In *Filostrato* (c. 1338; 1st ed. Venice, 1480), in the *Teseide* (c. 1341; 1st ed. Ferrara, 1475), and in the *Ninfale Fiesolano* (date uncertain; 1st ed. Venice, 1477; a good reprint in Torracca's *Poemeti Mitologici del Sec. XIV, XV, XVI*, Leghorn, 1888), Boccaccio employed, for the first time in narrative

poetry, the octave stanza, which was afterwards so prominent in Italian literature.

The series of prose works opens with the prolix *Filocolo* (1338-40; 1st ed. Florence, 1472; Eng. trans. by H. G., London, 1567). This was succeeded by the *Ameto* (1341-2; 1st ed. Rome, 1478); *Fiammetta* (before 1343; 1st ed. Padua, 1472), the heroine of which stands for Maria d'Aquino, and the hero, Pamfilo, for Boccaccio himself; the *Corbaccio*, or *Laberinto d'Amore* (1354; 1st ed. Florence, 1487); and the *Vita di Dante* (c. 1364; best ed. that of Macri-Leone, Florence, 1888; Eng. versions by Wicksteed, Hull, 1888, and Carpenter, New York, 1900: the former is restricted to the purely biographical sections), a sequel to which was his *Comento sopra la Commedia* (1373-5; ed. by Ciccarelli, Naples, 1723; better by Milanesi, Florence, 1863). The best collective edition of the minor works is still Moutier's *Opere Volgari di G. B. Corrette su i Testi a Penna* (Florence, 1827-34, vols. v.-xvii.).

The *Decamerone*, the book on which rests Boccaccio's chief claim to immortality, was composed for the most part between the years 1348 and 1353. The framework of the tales describes how, while the plague is raging at Florence in 1348, seven maidens and three youths of noble birth repair to a villa near the city, and, to while away the time, tell each a tale on ten successive days, making one hundred stories in all. The tales go back to the most various sources—Eastern, classical, and French stories, contemporary events, anecdotes, and scandals. (See Landau, *Die Quellen des Dekameron*, 2nd ed. Stuttgart, 1884.) Many great writers have borrowed from him—Chaucer, Shakespeare, Dryden, Lope de Vega, Molière, La Fontaine, Musset, Hans Sachs, and Les-

sing, to name but a few. The first edition is that of Venice (1470), and specially important among the early ones is that of Giunti (Florence, 1573). Good modern editions are those of P. Dal Rio (Florence, 1841-4) and P. Fanfani (*ib.* 1857). Hitherto the MS. Mannetti (1384) of the Laurenziana (diplomatic reprint, Lucca, 1761) has been considered the best; now the claims of the Berlin Hamilton MS. are being advanced. (See the treatise by Tobler, 1887, and by Hocker, 1892.) English versions: Anonymous, 1620 (vol. i. only); anonymous, 1702; Dryden's *Fables* (a small selection in verse), 1713; Balguy, 1741; Dubois, 1804; Kelly, 1835; Wright, 1874; Payne, 1886; unexpurgated trans. (1874).

His Latin works consist of:—(a) *De Genealogiis Deorum Gentilium* (1350-60; 1st ed. Venice, 1472; Ital. trans. Venice, 1547). (b) *De Claris Mulieribus* (1352-62; 1st ed. Ulm, 1473; by Albanzani, 3rd ed. Bologna, 1875). (c) *De Casibus Virorum* (c. 1363; Italian version, Venice, 1545; English paraphrase by Lydgate, *Falls of Princes*, 1st ed. 1394). (d) *De Montibus, Silvis, Fontibus, Lacubus, Fluminibus, Stagnis et Paludibus, et de Nominibus Maris* (1st ed. Venice, 1472; Italian version, Venice, 1520). The few Latin letters are distinguished in neither form nor matter (edited, with some Italian ones, by Corrazzini, Florence, 1877). More interesting, as throwing light on contemporary events, are the eclogues of the *Bucolicon* (Florence, 1504).

For a full account of all the editions, see *Serie delle Edizioni delle Opere di G. B.* (Bologna, 1875). Biographers. Ma. li (1742) and Baldelli (1806). Landau (Stuttgart, 1877; Italian version by Traversi, much enlarged, Naples, 1881) and Veselovsky (St. Petersburg, 1893-4) deserve careful study. See, too, J. A.

Symonds, *Boccaccio as Man and Author* (London, 1895); W. P. Ker, *Boccaccio* (Oxford, 1900); Edward Hutton, *Giovanni Boccaccio* (1909); and Lee's *Decameron and its Sources* (1909).

Bocage, MARIE ANNE FIQUET DU (1710-1802), French poetess, born at Rouen. Emulating Milton, she wrote *Paradis Terrestre* (1748); the poem *Columbiade* (1756), which brought her into notice; and *Lettres sur l'Angleterre, la Hollande et l'Italie* (1770). She was highly praised by Voltaire.

Boccalini, TRAJANO (1556-1613), Italian satirist, born at Loreto; became governor of several cities under the papal see (1608-1611). In 1612-13 appeared his *Ragguagli di Parnaso*, a work full of brilliant satire against contemporary politics and literature. An unfinished sequel, *La Pietra del Paragone Politico*, was completed by Girolamo Bruni (1615). An English version of these works, *Advertisements from Parnassus, together with the Politick Touchstone*, by Henry, Earl of Monmouth (London, 1656), reached the 3rd edition in 1674. Boccalini's *Commentarii sopra Cornelio Tacito* (Geneva, 1669) is couched in the same vein as the *Ragguagli*. See G. Mestica, *T. B. e la Letteratura Critica e Politica del Seicento* (Florence, 1878); G. Silingardi, *La Vita, i Tempi e le Opere di T. B.* (Modena, 1883).

Bocca Tigris, or **BOQUE FORTS**, at mouth of Canton R., China; taken by British in 1841, and again in 1856.

Boccherini, LUIGI (1743-1805), Italian musical composer and cellist, born at Lucca; studied at Rome, and spent the greater part of his life (from 1768) at Madrid as court composer. His instrumental works—mostly quintets, quartets, and trios—number 366; but of these 74 are unpublished. Of his vocal works, only the *Stabat Mater* is published. His

best works are still much appreciated for their originality, dignity of style, and melodiousness. See *Life*, in German, by Schletterer, and in French by Picquot.

Bocchus, king of Mauretania in Africa, father-in-law of Jugurtha, with whom he fought for a time against the Romans, but, changing sides, betrayed him to Sulla in 103 B.C. See Mommsen's *Hist. of Rome*, and Sallust's *Jugurtha*.

Bochart, SAMUEL (1599-1667), born at Rouen. As pastor in Caen, he publicly defended (1629) Protestantism in a public discussion with Véron, a Jesuit. His immense learning was exhibited in his *Geographia Sacra* (1646; later editions in 1651, 1674, 1681), on early Scripture history. After a brief visit (1652) to Stockholm, he published his greatest work, *Hieroicoicon* (1675, 1793-6), mainly on the natural history of Scripture, but also on fabulous animals in other literatures. See Haag's *La France Protestante*, vol. ii. (1846-59); *History of Rationalism*, by Hurst (9th ed. 1882); and *German Rationalism* (trans. 1865), by Hagenbmch.

Bochmann, GREGOR VON (1850), Russian painter; born at Nehat in Esthonia, Russia, and settled since 1868 at Düsseldorf, though he has made repeated journeys to Esthonia, Holland, Belgium, etc., for the subjects of his paintings. Among his best-known works are *A Church in Esthonia* (1874); *Potato Harvest in Esthonia* (1876); *Dockyards in Holland* (1878), now in the National Gallery at Berlin; *The Fish Market at Reval*; and *On a Country Road*.

Bochnia, tn., Galicia, Austria, 25 m. E. by S. of Cracow; has salt mines. Pop. 10,000.

Bocholt, tn., prov. Westphalia, Prussia, 44 m. W. by S. of Münster; has woollen and cotton industries, iron foundries, etc. Pop. 24,000.

Bochum, tn., prov. Westphalia, Prussia, 10 m. E. of Esson by rail; a chief centre of the Westphalian iron, steel, and coal industries, with coal mines, tin-smelting, brickworks, etc. Pop. 120,000. See Darpo's *Geschichte der Stadt Bochum* (1888-94).

Bockenheim, an industrial suburb of Frankfort-on-the-Main.

Böcking, EDUARD (1802-70), German lawyer, born at Trarbach, on the Mosel; in 1835 became professor of jurisprudence at Bonn. He published valuable editions of classic works of law, as *Notitia Dignitatum* (5 vols. 1839-50); *Institutionen, or Pandekten des Römischen Privatrechts* (2 vols., 2nd ed., 1853 and 1855). He also edited the complete works of Ulrich von Hutten (5 vols. 1859-62).

Böckingen, tn., Württemberg, Germany, near Heilbronn. Pop. 9,000.

Böcklin, ARNOLD (1827-1901), Swiss painter, a native of Basel. After studying (1845-50) in Düsseldorf, Antwerp, Brussels, and Paris, he settled in Rome, but in 1856 moved to Munich. Here he found a generous patron in Baron von Schack. Then he acted as art teacher at Weimar (1860-63), painted in Basel (1866-71), in Munich again (1871-4), and lived at Florence (1874-85), Zürich (1885-92), and Fiesole (1892-1901). One of the most notable painters of modern Teutonic art, he makes the figures and the backgrounds of the old (classic) myths live again before our eyes. He has, besides, a decided leaning towards the weird and the grotesque. Among his more remarkable works are *Pan amongst the Reeds*, *Pirates Plundering a Castle*, *Island of the Dead* (1883), *Panic Terror*, *The Sport of the Waves*, *The Stillness of the Sea*, *Tritons and Nereids*, *The Island of the Blessed*, *Battle of the Centaurs*, *Petrarch*, and *The Plague* (these three at Basel),

and *Sea Surges* and *A Recluse Playing the Violin* (at Berlin). See *Life* by Schmid in the portfolio of Böcklin's works (4 vols. 1892-1901); also monographs, in German, by Meissner (1898), Schick (1902), Mendelssohn (1901), and Floorke (1902).

Bocland ('book-land'), an Anglo-Saxon tenure (called also CHARTER-LAND, or 'deed-land'), was land granted by deed or 'book' from the king to the church or to nobles. It corresponded more or less to the later feudal tenure in fee simple, though the precise terms on which it was held depended on the actual words of grant. Land held by tenants of the lord of book-land was called 'laen-land.' Book-land was distinguished from 'folk-land,' which was probably land held by customary tenure as opposed to written grant. The conjecture of some writers, that land held by customary tenure was called *ethel*, and that folk-land was the public land from which book-land was severed and granted to private proprietors, is probably wrong; but the whole subject of land tenure in Anglo-Saxon days is obscure. See Pollock and Maitland's *History of English Law* (2nd ed. 1898).

Bocskey, STEPHEN (1556-1606), prince of Transylvania from 1604 to 1606. In 1604 the brutal conduct of Basta in Transylvania, and the attempts of Rudolf II. of Austria to destroy religious liberty in Hungary, led to an insurrection in Transylvania and in Hungary, the leader of which was Bocskey, who was proclaimed prince of Transylvania.

Bod, the most westerly of the feudatory states of Orissa, India. Area, 2,060 sq. m.

Boddam, fishing vil., E. Aberdeenshire, Scotland, 3 m. S. of Peterhead. Pop. 1,500.

Bode, JOHANN ELERT (1747-1826), German astronomer, born

at Hamburg. Director of the observatory in Berlin (1786-1825), he founded the *Astronomische Jahrbücher* (1776). His *Uranographia* (1801; new ed. 1819) comprises some 12,000 stars more than the earlier maps. His *Représentation des Astres* (1782), in 34 sheets, contains all the stars visible to the naked eye above the horizon at Berlin, as also the most important telescopic stars. An empirical formula denoting the relative distances of the planets is called 'Bode's Law.' Place a row of fours under the names of the planets ranged in a line in order of their distances. Then under this row 0, 3, 6, 12, and so on. Add the two columns: the result shows approximately the relative distances of the planets. The real relative distances, the earth's distance being reckoned as 10, are:

3.9	7.2	10	15	27.5
52	95	192	300	

Bode also wrote *Anleitung zur Kenntniss des gestirnten Himmels* (1768; 11th ed. 1858) and other books.

Bodegas, or BAHAGUO, cap. of prov. Rios, Ecuador; trading centre between Quito and Guayaquil, and about 40 m. N.E. of the latter; accessible to large steamers by the river Guayas. Pop. 8,000.

Bodenbach, tn., Bohemia, Austria, on the Elbe, 81 m. by rail N. by W. of Prague. It has a chalybeate spring. The industries are brewing, cotton-spinning, and the manufacture of sweetmeats. Pop. 11,000.

Bodensee. See CONSTANCE, L.

Bodenstedt, FRIEDRICH MARTIN VON (1819-92), German poet and dramatist; taught in Russia (1841-7), and became (1854) professor of Slavonic languages and (1858) of Old English literature at Munich. From 1867-73 he was connected with the famous Court Theatre at Meiningen, and from 1879-82 he was in the United

States. He was a prolific original writer, and also translated from Shakespeare, Hafiz, Omar Khayyam, Pushkin, Lermontov, Turgeniev. With Paul Heyse, Wilbrandt, Herwegh, Gildemeister, and others, he issued a German translation of Shakespeare's plays (9 vols. 1866-72) and sonnets (1862), and wrote useful books on Shakespeare's contemporaries (1862), female characters (1875), etc. He also wrote on Russian subjects; published original plays, such as *Kaiser Paul* (1876); various volumes of verse, including *Epische Dichtungen* (1863), and tales. See his *Ausgewählte Dichtungen* (1864) and *Gesammelten Schriften* (12 vols. 1865-69). From a certain easy philosophy, exemplified in his popular *Lieder des Mirza Schaffy* (1851; 145th ed. 1893; Eng. trans. 1880), Bodenstedt has been called *Der Horaz der deutschen Bourgeoisie*. The man and his works are best seen in his egoistic *Erinnerungen aus meinem Leben* (1888-90), and in an interesting series of letters edited by G. Schenck (1893).

Bodichon, MADAME (1827-90), an eager advocate of women's rights; was the eldest daughter (Barbara Leigh) of Benjamin Smith, for many years M.P. for Norwich. In 1857 she married Eugène Bodichon, M.D., and lived for some time in Algeria. She began in 1855 the agitation which resulted in the passing of the Married Women's Property Act, and contributed to the foundation of Girton College, Cambridge.

Bodin, JEAN (1530-96), French political philosopher; born in Angers, and studied at Toulouse. In 1561 he went to Paris as an advocate, and in 1566 he published a treatise on the method of studying history, which evoked the wrath of the great jurist Cujas. In spite of his Protestantism, Bodin began to rise in the official world. Though he had op-

posed Charles IX., and narrowly escaped the massacre of St. Bartholomew (1572), he was made *avocat du roi* at Laon. In 1580 he published his treatise on political philosophy, *La République* (Latin trans. 1586; English, 1606), in which he builds upon the family as the basis of settled government, the supreme embodiment of which is the sovereign. The Catholic League, however, became so strong that in 1589 Bodin felt compelled to join its ranks. By this time he was *procureur général*, and a marked man. In 1593, after the victories of Henry IV., Bodin once more ventured to break openly with the League. His *Heptaplomerics* (first published 1857) is a plea for religious toleration; though in his chief work, and in *Démonomanie* (1580), he shows himself a believer in the superstitious of his age. See Boudrillard's *Bodin et son Temps* (1853), and Sir F. Pollock's *Science of Politics* (new ed. 1902).

Bodle, a Scottish copper coin worth two pennies Scots, or one-sixth of an English penny, issued in the reign of Charles II., and said to have been named from Bothwell, an old Scottish mint-master.

Bodleian Library, Oxford, named from Sir Thomas Bodley, who, after the complete destruction (before 1557) of the ancient university library of Oxford, restored it (1598) by a large gift of books collected by himself. The library was opened (1602) with upwards of 2,000 vols. Later contributors include the Earl of Pembroke, with 212 vols. of Greek MSS.; Sir Walter Raleigh; Archbishop Laud, nearly 1,300 MSS. in eighteen languages; Sir Kenelm Digby, 238 MSS.; and Robert Burton. Of John Selden's library the Bodleian received about 8,000 vols. The great Lord Fairfax enriched it with many MSS., including Dodsworth's 161

vols. in English genealogy. Bishop Rawlinson's bequest (1755) included some 1,900 printed books and over 4,800 MSS. Nineteenth-century donations include Richard Gough's collection (1809), numbering over 3,700 MS. and printed vols., mainly in British topography; Edward Malone's collection of English drama and early poetry; Francis Douce's collection (1834); and Robert Mason's bequest (1841) of £36,000. The library now has over 700,000 volumes as bound up (probably more than twice as many separate title-pages) and 33,000 MSS. It is entitled to a copy of every book published in the United Kingdom, not being an unaltered reprint. The first catalogue of its printed books was published in 1605, by its first librarian; the last in 1843-51, in 4 vols., by its eleventh librarian. See 'The Foundation of Libraries,' chap. xix. of *Cambridge Hist. of English Lit.*, vol. iv (1909).

Bodley, JOHN EDWARD COURTENAY (1853), a student of European politics, was called to the English bar in 1874. He was private secretary to Sir Charles Dilke, when president of the Local Government Board in 1882-5. Since 1890 he has lived in France. See his *France* (vol. i., *The Revolution and Modern France*; vol. ii., *The Parliamentary System*, 1898; 7th ed. 1907); *L'Anglomanie et les Traditions Françaises* (1899); a French version of his own *France* (1901); *The Coronation of Edward VII.*, by command of the King (1903); *The Church in France* (1906); and three articles in *Encyclopædia Britannica* on 'The History of the Third Republic.'

Bodley, SIR THOMAS (1545-1613), English diplomatist and scholar. In 1585 he began his diplomatic career with a mission to Denmark. In 1589 he became the queen's representative in the United Provinces, where he acted

as a member of the council of state until 1596. The rest of his life was devoted to the foundation and development of the Bodleian Library at Oxford. See his own autobiographical *Reliquiæ Bodleianæ* (1703); Wood's *Athenæ Oxon.* (1813-20); Macray's *Annals of the Bodleian Library* (1868).

Bodmer, JOHANN JAKOB (1698-1783), one of the chief pioneers in the regeneration of German literature in the 18th century; was a native of Zürich, where (1725-75) he was professor of Swiss history. With Breitinger and others he founded a weekly critical periodical (1721-3), *Die Diskurse der Maler*, the object of which was to emancipate literature from the trammels of pedantic rule. The new 'Swiss' school won its way slowly, until its principles were adopted by Lessing and others. Bodmer also drew attention to the old German epics, particularly the *Nibelungenlied*, of which he edited part in 1757. For life and bibliography, see J. Baerentold's *Geschichte der Deutschen Literatur in der Schweiz* (1887-92).

Bodmin, par., munic. bor., and co. tn. of Cornwall, England, 30 m. N.W. of Plymouth. The chief manufactures are boots and serges. Pop. 5,400.

Bodo, scapt., Nordland, Norway, on the Saltenfjord, about 460 m. N. by R. of Christiania. Pop. 4,800.

Bodobriga. See BOPPARD.

Bodoni, GIAMBATTISTA (1740-1813), Italian printer. During his early manhood he worked (from 1758) in the printing-house of the Propaganda in Rome, and afterwards (1768) became superintendent of the Duke of Parma's press. In 1788 he published, under the title of *Manuale Tipografico*, a collection of 178 different types, increased in the 2nd ed. (1818) to 250. Between 1791 and 1813 he issued many beautiful editions of the classics, notably a

Homér in 1808; but they are more distinguished for typographic beauty than for accuracy.

Bodtcher, LUDVIG (1793-1874), Danish poet; spent most of his earlier life in Italy with the Danish artists, including Thorwaldsen. It was largely through his efforts that the works of the great sculptor were acquired for Denmark. He returned to Copenhagen in 1835. He produced two small collections of poems, which are among the best in Danish literature. See *Digte*, with Life, by Arontzen (4th ed. 1878); and G. Brandes's *Danske Digtere* (1896).

Body-cavity, or CÆLOM, the space which in many animals lies between the body-wall and the alimentary canal. It is seen perhaps in its simplest form in annelid worms, such as the earthworm, or the fishermen's lobworm, and there satisfies the following conditions: it is lined throughout by the cells of the middle layer (mesoblast) of embryology, communicates with the exterior by kidney tubules or nephridia, and gives rise to the genital products on its walls. Such a cavity is present, in theory at least, at some period of life in all animals except Cœlentera and Protozoa; higher animals are therefore sometimes called Cœlomata, in opposition to these two groups. But in many cœlomate animals—e.g. crustaceans and insects—the cœlom is obliterated at a very early stage, and in others—e.g. round worms—the space present between gut and body-wall fails to satisfy the conditions given above, and is therefore not a true cœlom.

Body's Island, long sandy isl. off coast of N. Carolina, U.S.A. A lighthouse (150 ft. high) stands 2 m. from its s. extremity.

Boece, or BOETHIUS, HECTOR (c. 1465-1536), Scottish historian, was probably the son of Alexander Boyis, a burghess of Dundee. He

studied in Paris, became a professor in the college of Montaigu in 1492, and made the acquaintance of Erasmus. He returned to Scotland about 1498, and became principal in 1505 of the University of Aberdeen. In 1522 he published the *Lives* of the bishops of Mortlach and Aberdeen (new ed. Bannatyne Club, 1875), at the press of Jodocus Badius in Paris; and in 1527 the *Historia Gentis Scotorum*, which was translated (1533) into Scottish prose at the request of James V., and into English for Holinshed's *Chronicles* in 1577.

Boeckh, PHILIPP AUGUST (1785-1867), classical philologist, born at Karlsruhe. Having since 1803 studied under Wolf, he became professor of philology in 1807 in Heidelberg, and in 1811 in Berlin, where he acted also from 1813 as director of the philological, and from 1820 of the pedagogical, seminary. His *Public Economy of Athens* (1817; enlarged 1840), of which there is an excellent translation by A. Lamb (1857), presents a complete and minute picture of classic Athens from every point of view. His edition of Pindar (1811-21) established the present basis of metre. His great work, *Corpus Inscriptionum Græcarum*, was continued by Franz, Curtius, Kirchhoff, and Rühl (1828-77). His minor writings appeared in 7 vols. (1858-74).

Boehm, SIR JOSEPH EDGAR (1831-90), British sculptor, born in Vienna, and studied in Italy, France, and in England, where he settled in 1862, and was elected A.R.A. (1878) and R.A. (1882). His chief works are: Statue of Queen Victoria (1869) in Windsor Castle, of Carlyle at Chelsea, and of Wellington at Hyde Park Corner; the Duke of Kent Monument in St. George's Chapel, and the Stanley Sarcophagus in Westminster Abbey. Boehm was appointed sculptor-in-ordinary to

Queen Victoria (1881), and created baronet (1889).

Boehme, or BOEHM (called also in England BEHMEN), JAKOB (1675-1624), German philosopher and mystic, was born in a peasant home at Altseidenberg, near the town of Görlitz, where he spent his industrious, contemplative life. As a boy, when herding cattle, he conceived a profound mystic sense of God in nature, which seemed an intimate revelation; and through the time of his very rudimentary education in the village school, of his apprenticeship to a shoemaker at the neighbouring town, and of his journeyman wanderings, until he settled down as a master workman at the age of nineteen, this emotional temperament grew into a consuming passion for truth. Boehme's books were limited to the Bible, in which he was deeply versed, and to a few theosophical and alchemistic writings, such as those of Paracelsus; and the task before his illiterate genius was to shadow forth, in those obscure symbols, natural images, and poetic suggestions which were his only instruments, philosophical conceptions which were new to his age, and which later were not easily expressed by Hegel. 'There reigns in his writings a twilight, as in a Gothic dome.' For Boehme, God is the One from whom all creation proceeds by His self-differentiation into a negation of Himself. Spirit cannot be, except it distinguish that which is not itself from itself; and this inner difference, beginning in God, and reproducing itself in all consciousness, is the principle by which the whole world is evolved. This negation of self, by which self arises, is variously identified with evil; and, again, the doctrine of the Trinity is never far from Boehme's meaning when he writes of the divine self-distinction. His earliest work, *Aurora* (1612), was

denounced from the pulpit, and he was forbidden by the magistrates of Görlitz to write any more. This injunction Boehme obeyed for some years, but finally broke through it. He was much harassed by pedant and official, but his quiet, humble spirit was undisturbed. Boehme has exercised a more powerful influence on minds concerned with experimental religion, and imaginations capable of spiritual desire, than on the direct development of academic philosophy. 'His best contributions,' says Dr. Stirling of Schelling, 'are those in analogy with Boehme.' But it is in writers such as William Law that we find the true line of descent; every page of Law's *Spirit of Love* shows his acknowledged debt to the German mystic. Boehme's collected works were published in Amsterdam in 1675, and again in 1730, and in Leipzig in 1831-46. They were translated into English shortly after his death.

Boehmeria, a genus of plants of the order Urticaceae, noted for the production of strong fibres, which are made into ropes and sailcloth. *Boehmeria nivea* fibres produce Chinese grass-cloth, which resembles linen. The plant is also cultivated in India, S. United States, and Jamaica. The rhea fibre of Assam is derived from the same plant. Puya fibre of Nepaul is got from *Boehmeria puya*, and is used for making ropes and sailcloth.

Boele, vil., Westphalia, Prussia, near Arnsberg. Pop. 6,500.

Boeotia, a district of ancient Greece, bounded on the E. by the Euboean Sea; S. by Attica, Megaris, and the Corinthian Gulf. Its inhabitants were said to be slow and heavy-witted. In the earliest times Boeotia was occupied by a race called the Minyai, whose chief city was Orchomenus. The Boeotian cities were united in a league,

and the history of Bœotia turns chiefly on the attempts made by Thebes to dominate this league. It was only after the battle of Leuctra, in 371 B.C., that the Thebans gained their aim; in 364 they destroyed Orchomenus. The Bœotians bore the brunt of the Greek resistance to Philip at Chæronea in 338 B.C.; and in 335 Thebes revolted against Alexander, and was destroyed, and Orchomenus was rebuilt. Henceforward Bœotian history is unimportant. Bœotia now forms one of the Grecian nomarchies (provs.). Pop. 66,000. See W. Rhys Roberts's *The Ancient Bœotians* (1895).

Boerhaave, HERMANN (1668-1738), a Dutch physician, born at Voorhout, near Leyden. Lecturer (1701), he became (1709) professor of medicine and botany, and (1714-36) rector of the University of Leyden, filling also, from 1718, the chair of chemistry. He was a pioneer in clinical medical instruction. His *Institutiones Medicæ* (1708) had great influence. Of equal merit are his *Elementa Chemicæ* (1724). Boerhaave was the first to lecture in Holland on diseases of the eye. See Burton's *Account of Boerhaave's Life and Writings* (1743), and Johnson's *Life* (1834).

Boers (Du. *boer*, a 'peasant or husbandman'; connected with Ger. *bauer*, 'peasant'), the farmers in S. Africa of Dutch descent who founded Cape Town in 1650.

Boer Wars. See SOUTH AFRICA.

Boethius, HECTOR. See BOECE.

Boëtius, or BOËTHIUS (c. 470-524), 'the last of the Romans whom Cato or Tully could have acknowledged for their countrymen' (Gibbon). His full name was ANICIUS MANLIUS SEVERINUS BOËTIUS. He became famous for his learning and knowledge of Greek philosophy, and was consul in 510, also chief of the senate. Theodoric, king of the Ostrogoths,

made him one of his most powerful ministers. But his protests against the excesses committed by the Gothic officers, and especially his defence of Albinus, who with Symmachus was accused of seeking to liberate Rome, brought him into disfavour with Theodoric. He was accused of treason, sentenced to death untried, and imprisoned in the tower of Pavia, where he produced his great work, the *Consolation of Philosophy*. He was executed in 525. He wrote many works on arithmetic, geometry, logic, and music which are extant, and translated the principal works of Aristotle. These were the chief sources for the knowledge which the middle ages had of Aristotle. A defence of the Christian faith is incorrectly assigned to him. His *Consolation of Philosophy* was translated by Alfred the Great (ed. Fox, 1864) and Chaucer (pub. 1480), and more recently by James (1897). It is a dialogue between the author and Philosophy, in prose and verse. Complete works, eds. of Basel (1570), Paris (1860); Peiper, *Consolatio* (1871); Friedlein, *De Institutione Arithmetica et Musica* (1867); Meister, *Commentaria in Aristotelem* (1877-80). See Gibbon's *Decline and Fall*; Bury's *Later Roman Empire* (1889); H. F. Stewart's *Boethius* (1891).

Bog. Bogs are most abundant in flat-lying countries, high latitudes, and near the sea, as high rainfall, cold climate, and insufficient evaporation favour their formation. Vegetation of a peculiar type is usually abundant—rushes, sedges, grasses, mosses, algae, and other plants adapted for aquatic conditions. There are many different ways in which they have originated. Some are old lakes which have become almost filled up; others lie in hollows in the surface of the boulder clay, left after the melt-

ing of the ice sheets of the great Ice Age; others are found in the deserted loops of river channels, or in the half-obliterated courses frequent in river deltas. A few are due to subsidence of the surface, owing to removal of underground materials (coal, salt, etc.). Mangrove swamps are characteristic of the sluggish waters which wind through the innumerable channels of many great tropical deltas—*e.g.* that of the Niger. On the east coast of the United States are many flat lands partly overflowed by the sea, and forming salt marshes. The economic importance of marshes and bogs is not great; peat, bog iron ore, and bog oak are their most valuable products. When reclaimed they may yield most fertile soils. See **BOG MOSSES**; **BOG PLANTS**; **ALLEN**, **BOG OF**; **PEAT**.

Bogardus, JAMES (1800-74), American watchmaker and inventor, born at Catskill, New York. Of his various devices the best known are the dry gas meter (1833), a medal-engraving machine (1836), and instruments used in rubber manufacture and deep-sea sounding. In 1839 he gained the prize offered by the British government for the best machine for the manufacture of postage stamps.

Bog Asphodel. See **ASPHODEL**, **BOG**.

Bog Bean; **BUCK BEAN**, or **MARSH TREFOIL** (*Menyanthes trifoliata*) belongs to the gentian order. It is found in Britain in marshy places, and perennates by means of rhizomes. In summer it sends up trefoil leaves, the leaflets being not unlike those of the cultivated bear. Its inflorescence grows directly from the rhizome, 6 to 10 in. high, and consists of a raceme of beautiful pink and white flowers which suggest the cultivated hyacinth.

Bog Butter, a kind of lard or tallow found in the peat bogs of

Ireland and Scotland, usually at a depth of from two to twelve feet below the surface, and encased in wooden kegs or dishes; sometimes in wicker-work baskets, bark or cloth wrappings, and even in rushes. Samples analyzed (1885) by W. Ivison Macadam (*Proc. Soc. Antiq. Scot.*, xvi. 206-208) all contained cow hairs; but the 'rue tallow' similarly treated by the Faroe Islanders in 1670 (see L. Debes's *Farøe, et Farøe Reserata*, trans. 1676) was principally obtained from sheep. Bog butter, being unsalted, was purposely sunk in peat to preserve it from becoming rancid. It appears to have been used in Ireland and the Hebrides down to the 18th century. It has sometimes been confused with adipocere.

Bögh, ERIK (1822-99), Danish author, born at Copenhagen; from 1855-60 artistic director of the Casino Theatre at Copenhagen; from 1860-77 editor of *Folkets Avis*, which he made the most popular paper in Denmark; and from 1881 censor of the Royal Theatre. He was regarded as one of the wittiest feuilletonist writers in Denmark.

Boghaz-Koï, or **BOGHÄZ-KÖI**, vil., prov. Angora, Asia Minor, 90 m. E. of Angora; has remains of an extensive ruined city which is now proved to have been one of the great centres of 'Hittite' civilization. In 1905-7 the ruins were scientifically explored by Winckler and Puchstein, and yielded numerous tablets of great historic interest (see Smithsonian Report, 1908, p. 677). See also Van Lennep's *Travels in Asia Minor* (1870), and Chantre's *Mission en Cappadoce* (1898).

Bogie, the small truck forming the front part of a locomotive engine. The front end of the boiler is pivoted to it, and thus the wheels of the bogie readily adapt themselves to the curves of the line, thereby lessening

wear and tear and the danger of derailment. Similarly, bogies are placed under each end of a railway carriage. See STEAM-ENGINE; RAILWAYS—*Rolling Stock*.

Bog Iron Ore, a spongy and porous form of limonite, known under this name from its being frequently found in meadows and bogs. In such situations the water absorbs much carbon dioxide from decomposing vegetation, and is thus able to dissolve out oxide of iron from the rocks through which it passes. On emerging to the surface the iron is precipitated in a brown pulverulent mass which may collect in such quantities as to be used as an iron ore, as is done in Norway and Sweden. The 'iron-pan,' a hard dark brown layer beneath the soil, a source of trouble to farmers, is a deposit of this nature. The beds of clay ironstone in the Carboniferous formation may be ascribed chiefly to these agencies.

Bog Mosses, or PEAT MOSSES, are species of *Sphagnum*, abundant in the marshes and peat bogs of temperate and cold regions; about a third of their number are tropical. They differ from most other mosses in being very spongy and full of water; they grow in dense masses and tufts, often of considerable depth, and are of various colours, from pale green or yellow to deep red. Peat is formed by the decay of their lower portions. See Braithwaite's *Sphagnaceae, or Peat Mosses of Europe and N. America* (1880).

Bog Myrtle, or SWEET GALE (*Myrica gale*), of the order Myricaceæ; looks like a dwarf willow, and forms low slender bushes on boggy ground and moorland in the British Isles, as well as throughout Middle and N. Europe, N. Asia, and N. America. It produces a fragrant resin, and on this account is used by country people for placing among clothes, to perfume them and to keep off insects.

Bognor, wat.-pl. and eccles. par., 9 m. by rail S.E. of Chichester, Sussex, England; pier and esplanade. Pop. 6,200.

Bogo, seapt. on N.E. coast of Cebu I., Philippines, 50 m. N. of Cebu, with good harbour. Pop. 15,000.

Bog Oak. Portions of trees are often found in peat bogs, showing that a forest formerly grew where mosses and other marshy plants which form peat have supervened. Oak, birch, hazel, and beech are the commonest trees; their wood, though preserving its original structure and grain, is usually black, dense, and difficult to work. It is valued for ornamental purposes; furniture and ornaments are made from it. Much so-called bog oak owes its dark colour to artificial treatment. See J. Gæikie's *Prehistoric Europe* (1881); Avebury's *The Origin of Civilization* (new ed. 1902).

Bogodukhov, or БОГОДУКHOB, town, Kharkov gov., Russia, 34 m. by rail W.N.W. of Kharkov; has tanneries. Pop. 20,000.

Bog of Allen. See ALLEN, BOG OF.

Bogomil (from Slavonic words meaning 'friends of God'), a religious sect whose chief seats were in Thrace, Macedonia, and Bulgaria, spreading over Servia, Bosnia, Dalmatia, and Croatia, where the sect was called Patarenes. The founder was probably a bishop named Bogomil, who lived in the 10th century, and one of their leaders was a monk, named Basil, in the 12th century, whose tenets were akin to those of the Manichæans and Gnostics. Basil was burned at the stake by the Emperor Alexius Comnenus in 1118. In spite of much persecution, the sect survived until the Turkish conquest in the 16th century, holding as its doctrines the origin of evil in declension from God, that Christ saved men by His teaching, the rejection of the sac-

raments, the use of images in worship, and the rejection of the books of the Old Testament except the Psalms and the Prophets. The sect practised severe asceticism. See Zegnbanus's *Panoptia*, edited by Gieseler (1852); Razki's *Bogomili i Paterani* (1869).

Bogong, MOUNT, Bogong co., Victoria, Australia, 160 m. N.E. of Melbourne; the highest summit in the colony. Alt. 6,508 ft.

Bogoroditsk, or BOHORODITSK, tn., Tula gov., Russia, 40 m. S.E. of Tula; has important tanneries. Pop. 5,000.

Bogorodsk, or BOHORODSK, m., Moscow gov., Russia, on an affluent of Volga, 50 m. by rail E. by N. of Moscow. Pop. 12,000.

Bogos, a pastoral tribe of Abyssinia. They are a well-built race, with expressive features and brown skin, patriarchal in their habits, and of Hamitic descent. They are mostly Christians. Chief tn. Keren. Pop. about 18,000.

Bogoslovsk, tnship., Perm gov., 170 m. N.E. of Perm city, Russia; has a meteorological observatory, and important copper mines and gold workings in the vicinity. Pop. 8,500.

Bogotá, cap. of Colombia, in the dep. of Bogotá, in 4° 35' N., 74° 13' W., is one of the foremost cities of South America. It is situated on an elevated plateau at the base of the E. range of the Cordilleras. The chief buildings are the capitol, the library, and the cathedral erected in 1563; the San Carlos palace, in which the president of the republic resides; and the meteorological observatory. Besides these, there are the university, museum, public library, mint, and theatres. Bogotá is the seat of an arch bishop. There are railways to several neighbouring towns, the longest of which is to Girardot (52 m.), on the Magdalena. The manufactures include pottery, glass, cordage, and cloth. Iron,

coal, salt, limestone, fire clay, and precious stones occur in the district. Founded in 1538 by Quesada, the town was called Santa Fé (after the camp of Ferdinand and Isabella before Granada), then Santa Fé de Bogotá, and since 1819 simply Bogotá. Alt. 8,670 ft. Pop. 125,000; the dep. has an area of 4,000 sq. m. and a pop. of 300,000.

Bog Plants include pitcher-plants and lady's-slippers, bird's-eye primroses, marsh orchises, sundews, Pinguiculas, Trilliums, and marsh marigolds, rushes, sedges, meadow-sweets, and ferns. For a bog garden an open situation should be selected, preferably on a slight slope, and should be excavated about two feet deep. The pit thus formed should be lined over its base and a foot up its sides with concrete, so as to be watertight. About eight inches from the base should be an escape pipe for surplus water. Or the base and the lower part of the sides may be lined with a thick layer of clay. Up to the level of this escape pipe a layer of broken stone should occupy the whole base. Over this should be placed a mixture of leaf-mould, peat, and fibrous loam, together with great blocks of stone, the whole being so arranged as to present an irregular surface and varying degrees of dryness. Water should be allowed to flow through daily. Care is needed to prevent the more vigorous plants from encroaching on and destroying their more dainty and less sturdy neighbours. In addition to the plants named, the following are all excellent: *Lilium canadense*, *L. pardalinum*, *L. superbum*, *Iris Kämpferi*, *Spiraea aruncus*, *S. venusta*, *Onoclea sensibilis*, *Gentiana verna*, *G. asclepiadea*, *Habenaria ciliaris*, *H. nivea*, *Orchis foliosa*, *Calla palustris*, *Epigaea repens*, *Lobelia cardinalis*, *Corydalis lutea*, *Aponogeton distachyon*, *Muosotis palustris*, *Mimulus*

luteus, *Arundo donax*, *Phormium tenax*, *Osmunda regalis*, *Bambusa Metake*, *B. glaucescens*, *Bocconia cordata*, and *Mecynopsis Wallichiana*.

Bogra, dist. and chief tn. in Rajshahi div., Eastern Bengal and Assam, India. Area, 1,359 sq. m. Pop. of dist. 850,000; of tn. 7,000.

Bog Spavin, a fluctuating swelling on the inner and front part of the hock of a horse, arising from a distension of the joint capsule with synovial fluid. See HORSE—*Diseases*.

Bogue, DAVID (1750–1825), Scottish Congregational minister, was born in Coldingham, Berwickshire; became pastor of a Congregationalist church at Gosport in 1777, and subsequently (1789) theological tutor at the theological seminary there. He was a founder of the London Missionary Society (1795), the British and Foreign Bible Society, and the Religious Tract Society. He wrote a *History of Dissenters* (3 vols. 1809), in conjunction with James Bennett and *Essay on the Divine Authority of the New Testament* (1801).

Boguslav, anc. tn., Kiev gov., Russia, 70 m. S.S.E. of Kiev; cloth manufacture and trade in wool, leather, and sheep-skins. Pop. 9,000.

Bogutschütz, tn., prov. Silesia, Prussia, immediately N.E. of Katowitz, with coal mines and zinc furnaces. Pop. 20,000.

Bohain, tn., dep. Aisne, France, 13 m. N.N.E. of St. Quentin; fortified, and said to have been besieged and taken thirteen times between 1181 and 1815; has brewing, tanning, wool-spinning, and dyeing industries. Pop. 6,800.

Bohemia (Boh. *Chechy*; Ger. *Böhmen*), a kingdom of the Austrian empire, with the kingdom of Saxony on the N., Bavaria on the W., Prussian Silesia on the N.E., and Moravia on the

E. The kingdom is fenced in by lofty mountain ranges—the Bohemian Forest on the S.W., the Fichtelgebirge and Erzgebirge on the N.W., and the Isergebirge, Riesengebirge, Adlergebirge, and other chains of the Sudetic system on the N.E. A broad but relatively low hilly region, constituting the watershed between the Elbe and the March, marks it off from Moravia; and the determining feature of the interior is the river Elbe. From the Bohemian Forest the surface slopes towards the Elbe in a series of terraces and hilly plateaus trenched by the Moldau and its tributaries. The only level tracts are the small expansions of the river valleys—e.g. at Prague, Pilsen, and Budweis. The climate resembles that of the interior of Germany, but is more severe in the mountainous parts on the borders than in the low-lying Elbe valley. The climate of Bohemia is continental in its character. The annual mean temperature at Prague is 46½° F.

With a fertile soil, an industrious population, and abundant mineral deposits, Bohemia is one of the richest divisions of the Austrian empire. Forests cover 29 per cent. of the surface; the remainder is under cultivation or under grass. Cereals thrive in the lower N. districts, potatoes and oats in the higher grounds. Beetroot is extensively grown for sugar. The most important minerals are coal and lignite, silver, iron, and graphite, with lead, tin, antimony, and gold. In point of value Bohemia produces one-half the mineral wealth of the entire empire. The lignite mines stretch along the foot of the Erzgebirge from Aussig to Eger, and produce annually some 18,000,000 tons; while the bituminous coal mines, most of them around Kladno (W. of Prague) and Pilsen, yield over 7,000,000 tons. Iron ore is mined near

Prague, Pilsen, and Falkenau, to the extent of 700,000 tons per annum; of this some 300,000 tons of pig iron are smelted at Prague and Pilsen. The mining of gold was revived in 1903, the principal mines being at Mount Roudny and at Krasna Hora. The most important industry is sugar-manufacturing; over 500,000 tons of raw sugar being produced yearly. Cloth and other woollen goods are manufactured at Reichenberg, Aussig, Friedland, and Asch; cotton goods at Prague, and generally from Reichenberg westwards to Brüx; carpets at Reichenberg and Eger; linens at Trautenau, Schönberg, and Hohenelbe; beer at Pilsen and Eger; glass at Prague, Eger, Pilsen, Gablonz, and Karlsbad. Nearly 200,000,000 gallons of beer are brewed annually; and the glass trade has been in a flourishing condition since its introduction from Venice in the 13th century. Of less importance are distilling, engineering, and printing. Along the N.W. border are the well-known mineral springs of Karlsbad, Marienbad, Franzensbad, Teplitz, Bilin, Johannishad, and Sodalitz. Bohemia is the centre of an active trade, and the Elbe is of the greatest importance as a means of communication. Prague is on the Moldau and the Elbe is 490 m. from Hamburg.

The Bohemians, who style themselves Czechs (Chekhs), are mostly of Slav stock, and have been settled in the land since the 5th century. About 37 per cent. of the population is of German descent, mostly town dwellers, and between them and the Czechs—mainly the peasants and aristocracy—there exists a bitter race enmity, which has been deepened in recent years by the attempt of the Czechs to wrest the political supremacy from the Germans. About 96 per cent. of the entire population is Roman Catholic; $\frac{1}{2}$ per cent. is Jewish.

At the end of the Thirty Years' war (1648) Bohemia had barely 800,000 inhabitants; in 1772 she had 2,314,795; in 1857, 4,705,527; and now the population is nearly 7,000,000, giving 348 to each sq. m. over the total area of 20,052 sq. m. The capital is Prague. Education over the kingdom is tolerably satisfactory. Prague includes the oldest of the German universities, founded in 1348. In 1882 it was divided into two separate universities, one German (1,700 students), one Czech (4,300). The Prague technical high school is similarly divided. There are two commercial academies (both at Prague), a mining academy (Příbram), two agricultural colleges (Tabor and Böhmisches-Leipa), a forestry academy (Weisswasser), and other technical institutions. Elementary education is compulsory from seven to fourteen. Secondary schools are organized on the German plan. Bohemia is governed by a provincial assembly of 242 members, and sends 110 members to the Austrian Reichsrath.

History.—When Bohemia (with which we here include Moravia) is first mentioned in history we find it occupied by the Boii, a Celtic tribe; hence the name Böhmen (Ger. *heim*, or home, of the Boii). The Boii were overcome (1st century B.C.) by the Marcomanni; and when the latter had been crushed by other tribes, the Slavonic Czechs made their appearance (about 450 A.D.), and have since occupied the country.

For a long time after this the history of the country is a blank. It is impossible to accept the stories of Kosmas about Krok, Premysl, and Libusa. The Bohemians are supposed to have been tributary to Charlemagne. In the 9th century Christianity was introduced among them by Cyril and Methodius. We hear of the great monarch Svatopluk of

Moravia; but the history of these countries till the time of Wenceslaus I. (Vaclaw), who was crowned king in 1230, is devoid of interest. His son was Premysl Ottokar II. (1253-78), who has been accused of introducing German colonists into his kingdom. He went on an expedition against the heathen Prussians; many of them were converted, and the city of Königsberg was founded. In 1260 he defeated the Hungarians with great slaughter. In 1273 Rudolph of Hapsburg was elected German emperor, and proved one of the most bitter enemies of the Bohemian king. A great battle took place (1278) near Marchfeld, and Ottokar was defeated and slain. He was succeeded by his son Wenceslaus (1278-1305), during whose reign the country was very prosperous. This king, when preparing to invade Austria, died suddenly in 1305, at the age of thirty-four. He was succeeded by his son Wenceslaus III., who only reigned one year, and was assassinated at Olmütz; thus the male line of the dynasty of Premysl came to an end.

After the very short and fruitless reigns of another Rudolph of Hapsburg and Henry of Carinthia, the choice of the Bohemians fell on John of Luxemburg, only son of the German emperor Henry VII. The rule of King John (1310-46) was bad for the country, the revenues of which he squandered. He was a kind of knight-errant of the period. In 1336, while on a crusade against the heathen Lithuanians, he lost one of his eyes; this calamity was soon followed by total blindness. He went to assist his brother-in-law, the king of France, and was killed at the battle of Crécy in 1346. He was succeeded by his son Charles IV. (1346-78), who was a great lover of the Bohemian language, and founded (1348) the University of Prague. In 1356, at the

Diet of Metz, he issued the celebrated Golden Bull, which, among other things, is noteworthy for its recommending that the German princes should learn the Bohemian language. This sovereign died in 1378, aged sixty-two. His daughter Anne became the wife of Richard II. of England. Charles was succeeded by his son Wenceslaus IV. (1378-1419), a drunkard, who caused St. John Nepomuk, now the patron saint of Bohemia, to be thrown into the Moldau.

At this time the country was moved by the doctrines of Wycliffe, which had been carried thither by Peter Payne. The great preacher of the new teaching was John Huss or Hus, although the movement was strongly leavened with nationalist aspirations. Huss was burnt at the Council of Constance in 1415. Bohemia was now agitated by religious wars, and the chief general on the side of the reformers was John Ziska. Wenceslaus died in 1419, and was succeeded by his brother Sigismund, the German emperor, who died in 1437. He was succeeded by Albert, Duke of Austria; but he only held rule for two years, dying in 1439. His sympathies lay entirely with the Germans. After his death his queen, Elizabeth, only daughter of Sigismund, gave birth to a son named Ladislaus Posthumus. During the minority of the king, George Podebrad was entrusted with the administration of Bohemia. The young king died prematurely in 1457. On his death Podebrad, who had proved himself an excellent ruler, was unanimously chosen (1458) king by the Bohemian Estates. Pope Paul II., however, regarded the new Utraquist king with the greatest abhorrence. Podebrad was engaged in continuous fighting with Matthias Corvinus, the vigorous king of Hungary, and

succeeded in driving him completely out of Moravia. He died, however, of dropsy in 1471, and was succeeded by Ladislaus II., son of Casimir IV. of Poland. In his reign the contending religious parties were reconciled by the peace of Kuttenberg (1485); but in 1487 the bondage of the peasants was finally established in Bohemia. Ladislaus was a weak man, and governed both Bohemia and Hungary, which were now temporarily united, in an inefficient manner. He died at Buda, the capital of Hungary, in 1516. His son Louis succeeded him. Previous to his death Ladislaus had negotiated two family marriages, which were destined to be of great historical importance. The Archduchess Mary, grand-daughter of the Emperor Maximilian, was to marry Louis, and Louis's sister Anne was to marry the Archduke Ferdinand, grandson of the emperor. Louis was a young man of feeble constitution, and reigned only ten years, dying at the age of twenty. The great event of his reign was the invasion of Hungary by the Sultan Solymán. The Hungarians were outnumbered, and suffered a disastrous defeat (Aug. 29, 1526). The king was drowned in the marshes while trying to escape. After considerable discussion, the Bohemian Diet elected the Archduke Ferdinand to be their king, according to the Family Compact.

From this time forward the two smaller kingdoms were constrained to follow the fortunes of their Hapsburg masters. Ferdinand was not often in Bohemia, and his presence was generally for mischief. He procured (1547) that he should be nominated hereditary instead of elective ruler. In the same year certain of the leading men in Prague endeavoured to get back some of those ecclesiastical and political liberties which the king had stolen;

but he was able to crush the movement, and the ringleaders were executed. In 1556, during one of his visits to Bohemia, Ferdinand introduced the Jesuits, who had a great reactionary influence upon the country. He died in 1564, and was succeeded by his son Maximilian (Emperor Maximilian II.), who had a short but troubled reign. In spite of his tolerant views, he failed to make himself popular with the Bohemians. He died in 1576, and was succeeded by his son Rudolph, who also became German emperor (Rudolph II.) and king of Hungary. He fixed his residence at Prague, and thus practically made it the capital of the Austrian dominions. Rudolph was ultimately compelled by his subjects to grant (1609) the celebrated Letter of Majesty, which ensured religious toleration. The emperor was gradually driven from his dominions by his younger brother Matthias, and compelled to abdicate in 1612. Matthias confirmed the Letter of Majesty, but the quarrels between the Catholics and Protestants still continued. The emperor procured the election of his cousin Ferdinand (afterwards Emperor Ferdinand II.) as king of Bohemia, and the latter confirmed and even enlarged the Letter of Majesty. At a Diet in 1615 Bohemia was proclaimed the official language of the country.

In spite of his pretended toleration of Protestantism, Ferdinand had really taken an oath to extirpate heresy. On May 23, 1618, occurred the well-known Defenestration, as it is called, whereby Slavata and Martinitz, two creatures of Ferdinand, were flung by the patriotic Protestant party out of the windows of the Hradschin. This was the beginning of the Thirty Years' war (1618-48). Matthias died in 1619, and Ferdinand II. succeeded. The events of the Thirty Years' war belong

to Austrian and German history. The Estates of Bohemia deposed Ferdinand II., and chose (1619) Frederick, the Protestant Elector Palatine, who, however, fled after the battle of the White Mountain in 1620, leaving his partisans to their fate. Many of the leading Protestants were executed, others driven into exile. The Emperor Ferdinand II. died in 1637, and was succeeded by his son Ferdinand III. The political and religious liberties of Bohemia were now annihilated, and the national language began to decay. But religious freedom was restored by the Edict of Toleration in the reign of Joseph II. (1780-90), in consequence of which many concealed Protestants declared themselves in Bohemia. In 1848 the country was agitated by revolutionary movements. The most important events since that date have been the quarrels between the Germans and the Czechs, and the political agitation for autonomy carried on by the vigorous Young Czech party. See F. Palacky's *Geschichte von Böhmen* (5 vols. 1844-67); Bachmann's *Geschichte Böhmens* (vols. i. and ii. 1899-1905); Lützow's *Bohemia* (1896); Maurice's *Bohemia* (1896); Baker's *Pictures from Bohemia* (1894); Coles's *The Gipsy Road* (1894); Hodgson's *On Plain and Peak* (1898); and Monroe's *Bohemia of the Czechs* (1910).

Language and Literature.—The Bohemian language belongs to the western branch of the Slavonic languages, and is closely connected with Slovakish, which is spoken in the northern parts of Hungary. Bohemian literature may be divided into three leading periods—(1) from the beginning till the Hussite wars (1410); (2) from the time of Huss to the latter part of the 18th century; (3) from the renaissance of the literature till our own days. The earliest productions are religious hymns. We will pass over

the *Libusin Soud* and the *Kralodvorsky Rukopis*, the authenticity of which has long been, and still is, disputed. Between 1240 and 1253 appeared an interesting version of a Latin *Alexandris*, and we have also versified lives of saints. To the 14th century belongs the chronicle called after Dalimil, although the real name of the author is unknown. It is in verse. Some clever satires were written by Smil of Pardubitz, surnamed *Flaska*, who was killed in 1403. To this period belongs *The Book of the Old Lord of Rosenberg* (*Kniha Starcho Pana Rozenberka*), one of the earliest specimens of Bohemian prose; and also the *Exposition of the Law*, by Andrew of Duba. By the beginning of the 15th century the translation of the Bible into Czech had been accomplished.

The second period begins with the name of Hues, who did a great deal to settle Bohemian orthography. Some of his writings are in Latin, but he left a fair number in Bohemian. Peter Chelcicky (1390-1460) wrote a celebrated work, the *Net of Faith* (*Sit Viny*). In 1487 the first regular printing press was set up at Prague, and the Bible was printed there in the following year. Some interesting volumes of travels were published. Gelenius and Veleislavin (1546-99) worked as humanists, and did much to spread the renaissance in Bohemia. Hajek (1495-1553) wrote a curious chronicle, with which he incorporated all the early Bohemian legends, so that his history is more amusing than reliable. Harant published his travels in the Holy Land, and we have the narrative by Wenceslaus Vratislav of Mitrovitz and his captivity at Constantinople. But the efforts of the Bohemians, both in their Diet and in their literature, to preserve the national language were rendered fruitless by the battle of

the White Mountain in 1620, and for nearly two hundred years Bohemia was lost to the European nations. John Amos Komensky (more familiar to Englishmen in the Latin form of his name, Comenius) composed his valuable works on education, in exile. He died in Holland in 1670 (born in 1592). It was not until nearly the close of the 18th century that a revival of Bohemian literature took place. It began with Joseph Dobrovsky (1753-1829), who wrote a grammar of Czech and an epoch-making work on Old Slavonic (Vienna, 1822). Jungmann (1773-1847) compiled a valuable dictionary, and Kollar (1793-1852) and Celakovsky (1799-1852) gained reputation as poets. In our own days Bohemian literature has been greatly developed. Palacky (1798-1876) was the author of the great national history, and by his monumental work taught the Bohemians to remember their historic past. His literary labours have been carried on by Tomek. A valuable worker in the field of history is Joseph Kalousek. A history of Bulgaria was written by Constantine Joseph Jiricek (1854). Among the most celebrated poets are Jan Vrchlicky, born in 1853, a voluminous writer; Sladek (1845), Halek (1835-74), Zeyer (1841), and Henrietta Pech, who writes under the name of Eliska Krasnohorska. The first to collect the folk-tales of the country was Bozena Nemcova (1820-62). Schafarik (1795-1861) was the first to treat scientifically the ethnology of the Slavonic races. His book is familiar to most students in the German translation, *Slavische Alterthümer* (1837). See the exhaustive *History of Bohemian Literature*, in Czech, by Jiricek (1874); also others by Sabina (1863-6), Sombera (4th ed. 1874), and Tieftrunk (3rd ed. 1895); Pypin and Spasovics's *Geschichte der Slavischen*

Literaturen (Ger. ed. 1880-4); the *Czech Encyclopædia* (11 vols. 1869-74), and its Supplement (17 vols. 1888-1901); and Lützw's *History of Bohemian Literature* (1899).

Bohemian Brethren. See MORAVIANS.

Bohemian Forest (Ger. *Bohmerwald*), a mt. range separating Bavaria from Bohemia; stretches from the Fichtelgebirge s. to the Danube, some 150 m. It reaches its maximum elevation in Arber (4,785 ft.) and Rachel (4,770 ft.), though the average altitudes lie between 2,500 ft. and 4,500 ft. With the exception of the highest summits, the range is covered with dense forest, and is crossed, at altitudes varying from 1,600 to 3,400 ft., by three railways and four roads, the best known being the 'golden ladder' from Passau to Strakonitz. Near the southern extremity of the range, and between it and the Danube, the Bohemian Forest is accompanied by its parallel outlier the Bavarian Forest, which culminates in the Dreitanenriegel (3,990 ft.).

Bohemond I. (1056-1111), prince of Antioch, the eldest son of Robert Guiscard, won renown (1081-5) against Alexius Comnenus, emperor of Byzantium, and in the first crusade (1096), capturing Antioch (1098), of which he became prince, but was himself captured (1100) by the Turks and imprisoned for three years. He renewed unsuccessfully the war (1107-8) against Alexius. He died at Canosa, in Apulia. In the sovereignty of Antioch he was succeeded by six princes of his name, the principality being destroyed by the Mamelukes in 1268. See Gibbon's *Decline and Fall*, ch. lviii. and lx.; and Hagenmeyer's *Gesta Francorum* (1890).

Bohlen, PETER VON (1796-1840); German Orientalist, born in Oldenburg. In 1822-4 he attended A. W. von Schlegel's lectures on Sanskrit at Bonn, and

in 1828 became professor of Oriental languages at the University of Königsberg. Among his principal works are *Das alte Indien* (2 vols. 1830), once a popular book, though now antiquated; *Ueber den Ursprung der Zendsprache* (1831); and translations of two Sanskrit poems in the original metre—viz. *Bhartriharis 'Sententie'* (1833), and *Ritusanhara, sive Tempestatum Cyclus, Carmen Kalidasi* (1840). See his *Autobiography* (1841).

Böhme. See BOEHME, JAKOB.

Böhmen. See BOHEMIA.

Böhmer, EDUARD (1827-1907), German philologist and theologian; born at Stettin. He became professor of Romance philology at Halle in 1868, and in 1872 at Strassburg. He published an edition of Spinoza's *Tractatus de Deo et Homine* (1852); *Ueber die Apokalypse* (1855); *Das erste Buch der Thora* (1862); *Ueber die Provenzalische Poesie der Gegenwart* (1870); an edition of the poem of Roland under the title *Rencessal* (1872); *Pindars Sizilische Oden mit Prosaübersetzung* (1892). He edited also the review *Romanische Studien* (5 vols. 1871-80).

Böhmerwald. See BOHEMIAN FOREST.

Böhmisch-Leipa, tn., Bohemia, Austria, 40 m. N. by E. of Prague, with railway workshops, calico printing, and other industries. Pop. 11,000.

Böhmisch-Trubau, tn., E. Bohemia, Austria, 32 m. E.S.E. of Pardubitz. Has textile industries. Pop. 6,000.

Bohn, HENRY GEORGE (1796-1884), English publisher, was the son of a Westphalian bookbinder, who settled in London in 1795. In 1846 he began the cheap issue of notable books with which his name is associated. Besides the *Origin and Progress of Printing* (1857), and the *Biography and Bibliography of Shakespeare* (1863), which he

wrote for the Philobiblon Society, Bohn compiled several works for his 'Libraries,' edited Lowndes's *Bibliographer's Manual* (1857-64), and published his own translations of Goethe, Schiller, Humboldt, and Petrarch.

Bohol, or BOJOL. (1.) Island lying between Leyte I. and Zebu or Cebu I., Philippine Is.; 70 m. N.W. of Mindanao; produces hemp, cacao, cotton, timber, sugar, tobacco, and millet. Cap. Tagbilaran. Area about 1,400 sq. m. Pop. 245,000. **(2.)** Prov., Philippine Is., including Bohol I. and dependent islands. Area, 1,614 sq. m. Pop. 270,000.

Bohrdt, HANS (1857), German marine painter, self-taught, born at Berlin; has produced numerous pictures depicting the sea and the movements of ships, as *Reception of the Emperor William II. at Spithead on Aug. 2, 1889* (1890), *The Meteor* (1891), *Brandenburg's First Sea-fight* (1893)—all three in possession of the Emperor William II. —*Opening of the North Sea-Baltic Canal* (1896), in the Berlin National Gallery; *Sea-fight off Gothland in 1564* (1901); *The Viking's Last Voyage* (1896). In 1898 he was appointed professor at the Academy of Painting in Berlin.

Bolardo, MATTEO MARTA, Count of Scandiano (c. 1434-94), Italian poet, born near Reggio, in Emilia; appointed governor of Reggio (1478), of Modena (1481), and again of Reggio (1487-94). His fame as a poet rests chiefly upon the romantic lyric *Orlando Innamorato*; but he also showed himself a worthy follower of Petrarch in his *Amorum Libri Tres* (1499; new ed. by Panizzi, 1835), and in five allegorical eclogues written in 1471-2. He further translated from Herodotus, Xenophon, Apuleius, and Cornelius Nepos, and dramatized Lucian's *Timon*. The two first parts of the *Orlando* appeared at Venice in 1486; the three parts complete at Scandi-

ano in 1495. See Stiavelli's ed. of the *Orlando* (1894), and Panizzi's ed. (1830), vol. ii. of which contains Boiardo's biography; also Ferrari and Campanini's *Studi su M. M. B.* Ariosto continued the theme of Boiardo's masterpiece in his *Orlando Furioso*.

Boie, CHRISTIAN HEINRICH (1744-1806), German critic and editor, was, from 1769 onwards, the leader of the Göttingen poets, of whom he was at once the oldest and the most mature and moderate. He is important mainly as the editor of the *Göttinger Musenalmanach* (1770-5), the first German imitation of the French *Almanach des Muses* (1765). The volumes for the years 1773 and 1774 are the chief manifestoes of the revival in German lyric poetry; they contain Bürger's *Lenore*, poems by Goethe and Schiller, and some of the best work of Hölty, Miller, and Fritz Stolberg. Boie subsequently edited an excellent monthly, *Das Deutsche Museum* (1776-88), later *Das Neue Deutsche Museum* (1789-91). See Weinhold's *Life* (1868).

Boieldieu, FRANÇOIS ADRIEN (1775-1834), master of the French school of comic opera, was born at Rouen; studied under Cherubini at Paris, where he was appointed to a professorship in the Conservatoire. He lived in St. Peter-burg (1803-10), but spent most of his life in Paris. Of his numerous works the most popular are *Le Calife de Bagdad* (1799), *Jean de Paris* (1812), and *La Dame Blanche* (1825), his *chef-d'œuvre*. He possessed a charming gift of melody, and his instrumentation, though light, is always full of grace and refinement. See *Life* by Prugin, in French (1875).

Boii, a Gallic tribe which at an early date crossed the Alps, and settled partly in Italy between the Po and the Apennines, and partly in Germany, in Bohemia (which derives its name from

them), and between the Danube and the Tyrol. After many wars the Romans subdued the Italian Boii in 191 B.C.; the German Boii were expelled, at the end of the 1st century B.C., by the Marcomanni.

Boil, a circumscribed gangrenous inflammation of the skin, or of subcutaneous connective tissue, or of a gland, with the formation of a core of dead tissue. Boils occur in persons who are run down, or whose blood is impoverished or poisoned by unsuitable diet, and are formed especially in those parts where the skin is irritated by rubbing or pressure. The micro-organism *Staphylococcus pyogenes* is always present in a boil. The most efficient treatment is to improve the general health. When large boils have become soft, they should be lanced freely and dressed antiseptically. In their early stages they may often be stopped by rubbing in corrosive sublimate (1 part) mixed with white vaseline (2,000 parts). But it is more important to take very little meat or alcohol, increase the farinaceous and fatty elements of diet, stimulate the hepatic and digestive functions (e.g. by calomel), and take sufficient physical exercise and rest. Boils are liable to occur in recurrent crops, a condition termed furunculosis. Obstinate cases are now successfully treated by VACCINE THERAPY.

Boileau-Despréaux, NICOLAS (1636-1711), French poet and critic, born in Paris, studied successively for the church and the bar, but in 1657 determined to devote himself to poetry. About 1660 he came into notice by certain satires in the manner of Horace and Juvenal. Seven of them, along with a *Discours au Roi*, were published in 1666, under the title *Satires du Sieur D** (i.e. Despréaux: he published his poems anonymously till 1701), two others being added in 1668 in the third

edition. From 1669 to 1674 he was engaged on the *Art Poétique* (new ed. 1888), a work of extreme importance, not merely as the 'declaration of the literary faith of a great age'—for Boileau had reasoned out much of it with Molière, La Fontaine, and Racine—but also as the most complete modern expression of the doctrines of classicism in literature. In the same volume as the *Art Poétique* appeared a translation of Longinus, the first four cantos of the *Lutrin* (a serio-comic epic, and perhaps his most popular work), and the first four *Epistles*. In 1677 he was appointed, with Racine, historiographer-royal. He published the two concluding cantos of the *Lutrin*, with five new *Epistles*, in 1683; but his later poetic work consists only of the unfortunate *Ode sur le Prise de Namur* (1693), three satires (1693-1705), three epistles (1695), and a few epigrams. He was the chief defender of the ancients in the quarrel of the ancients and the moderns, and replied to Charles Perrault in his *Réflexions Critiques sur Longin* (1693-1710). The chief characteristic of Boileau's verse is its impeccable form; but he is lacking in delicacy and imagination. His influence in England may be traced in Roscommon's *Essay on Translated Verse* (1681), Sheffield's *Essay on Poetry* (1682), and Pope's *Essay on Criticism* (1711). A complete translation of his works, 'made English by several hands,' appeared in 1712 (3 vols.). His other works include the *Dissertation Critique sur Jocrande* (1662-5), *Dialogue sur les Héros de Roman* (1664 or 1665), *Discours sur la Satire* (1668), *Discours sur l'Ode* (1693); and more than a hundred of his letters have been published. See complete works, ed. Brossette, 2 vols. (1716), and Saint-Marc, 5 vols. (1747); Boileau, *L'Art Poétique*,

ed. D. N. Smith (1898); *La Vie de M. Despréaux*, by Desmaizeaux (1712); Boileau, by Morillot, in the *Classiques Populaires* (1891); Boileau, by Lanson, in the *Grands Ecrivains Français* (new ed. 1900).

Boiler. A boiler is a vessel in which steam is generated. The gases produced by the more or less complete combustion of the fuel—solid, liquid, or gaseous—in the furnace of the boiler act as a carrier of the heat to the various parts of the heating surface through which the heat is transmitted to the water by conduction. It is essential that the furnace should have sufficient dimensions to allow of enough air being present to consume the fuel properly, and that the area of the surface designed to absorb the heat should be such that the products of combustion may be rejected at as low a temperature as practically possible, which of course must be higher than the temperature of the water in the boiler. With careful stoking, in a well-designed boiler it is estimated that each pound of coal of good average quality will evaporate about 9½ lbs. of water from and at 212° F. (each pound of water thus evaporated being equivalent to 966 heat units). The quantity of coal consumed per hour on each square foot of fire-grate surface depends partly on the draught, and partly on the volume of the combustion space above the grate. The ratio of heating surface to fire-grate area varies greatly, as the table below indicates. The heating surface comprises the walls of the furnace or combustion chamber, together with those portions of the boiler in the furnace tubes or flues which are in contact with the furnace gases whilst on their way to the chimney.

Natural or chimney draught is caused by the difference in weight between the products of combustion in the chimney and an equal

volume of cooler air outside; on this account it is necessary that the waste gases should leave the boiler at a comparatively high temperature (about 900° F.). With *forced draught* the air is not *drawn* through the furnace as with natural draught, but is made to enter under a small pressure. It is therefore possible to use more heating surface for a given grate area, and the products of combustion can be discharged at a lower temperature, thus increasing the efficiency of the boiler. With a properly arranged system of forced draught, an increase in economy of 15 per cent., as compared with natural draught, may result. In

of air is, of course, absolutely necessary; but too much must be avoided, otherwise the flue-gas loss is increased; also, to bring about perfect combustion, the air must enter above as well as below the fire. Careful attention must be given to the stoking: it is not conducive to economy to introduce large quantities of fuel at a time, because the rich volatile hydrocarbons in the fuel are then distilled off without being consumed. A much thicker fire (10 to 14 in.) may be used with forced than with natural draught (about 8 in.).

The rate at which heat is conducted through the walls of a boiler depends mainly upon the

Type of Boiler.	Draught.	Coal consumed per Square Foot of Grate Area per Hour (lbs.).	Square Feet of Heating Surface for each Square Foot of Grate Area.
Lancashire and Cornish.	Natural.	10 to 18.	} 15 to 25.
	Forced.	15 to 26.	
Multitubular marine .	Natural.	15.	} 25 to 50.
	Forced.	30.	
Locomotive	Induced.	30 to 120.	50 to 75.
Water tube	Natural.	12 to 22.	} 25 to 50.
	Forced.	45 to 60.	

land practice it is usual to add to the heating surface by introducing an *economizer*, which acts as a feed-water heater by utilizing some of the otherwise wasted heat in the flue gases.

Theoretically, 1 lb. of average British coal requires about 11 lbs. of air for its complete combustion; but practical tests of boilers show that at least twice as much is actually used in an ordinary boiler, and from 15 to 20 per cent. of the total heat of combustion escapes in the flue gases. A well-arranged boiler will utilize about 70 per cent. of the available heat in the fuel; with an economizer added, the efficiency may be raised to 79 per cent. A good supply

difference in temperature between the hot furnace gases and the water, and the rapidity with which the steam, when formed, can escape from the surface at which it was generated. The iron or steel of which a boiler is usually made is a good conductor. Steam, on the other hand, opposes the passage of heat; and in order that the maximum transference of heat may be brought about, it is necessary that there should be a vigorous circulation of the hot gases and the water on the opposite sides of the boiler plates. The presence of even a very thin layer of scale on the boiler plates greatly impedes the passage of heat through them; in fact, want



The Boilers of S.S. 'Mauretania' when ready to be put on board.

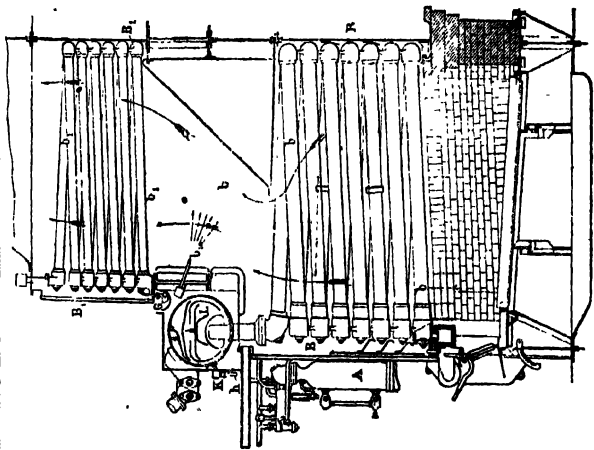


FIG. 9.—Belleville Boiler.

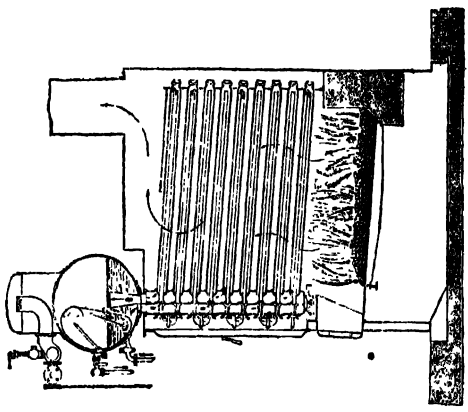


FIG. 10.—Niclausse Boiler.

generator elements. The object of the economizer is to heat the feed-water before it is introduced into the top drum. The feed-water is supplied by feed-pumps to an automatic feed-regulator, A, and passes from thence to the bottom feed-collector, G, of the econo-

the bottom to the bottom feed-collector, and from thence to the generating elements. The Belleville was fitted to H.M.S. *Powerful* and H.M.S. *Terrible* (14,200 tons) in 1895; each of these has forty-eight boilers of this pattern. In 1901 the Boiler Committee of the

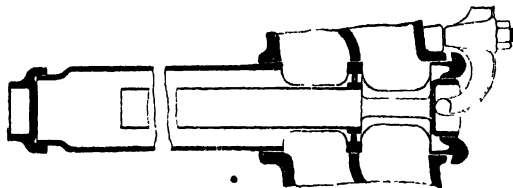


FIG. 11.—*Tube of Niclausse Boiler.*

mizer. After traversing the tubes of the economizer, the heated feed-water passes into another collector communicating with the top of the economizer elements, and is then led into the steam drum L. From the steam drum the feed-water passes down an external down-comer with a settling drum at

Admiralty reported unfavourably of the Belleville boiler; but the question of the best type of marine tubular boiler can hardly be regarded as being definitively settled.

The Niclausse boiler (Fig. 10) consists of a number of compound tubes slightly inclined, and con-

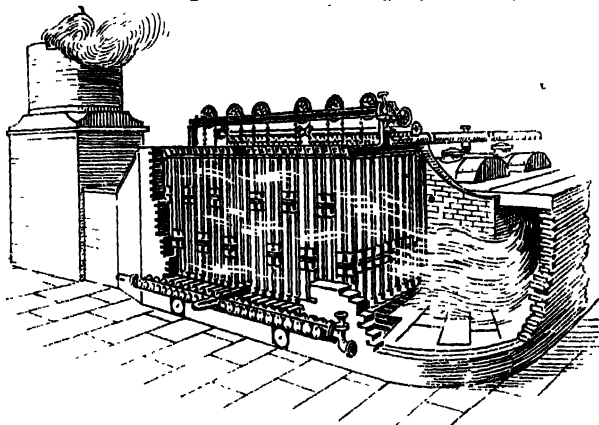


FIG. 12.—*Green's Economizer.*

nected at the ends to vertical headers, which are divided by a vertical diaphragm, parallel to the front and rear faces of the header, into a front and a rear compartment. The tops of the headers communicate with the steam and water drum. These headers are all at the front end of the boiler, none being provided at the back. The inclined heating tubes (Fig. 11) are double, having a concentric inner water tube running down them for nearly their whole length, the external tubes being closed at the rear end. The feed-water goes down the front compartment of the header, passes through the inner tube of the compound tube, and the steam generated passes on the outside of the concentric tube, and up the rear compartment of the header into the steam drum. The circulation of the water and steam is shown by the arrows in Fig. 10.

(The illustrations of Belleville and Niclausse boilers have been taken by permission from *Water-tube Boilers*, 1901, by Leslie Robertson.)

Feed-water Heaters.—One of the most important means for the increase of boiler-plant efficiency consists in heating the feed-water as much as possible before its entry into the boiler. This is best done by utilizing some of the heat of the products of combustion which would otherwise escape up the chimney. One of the best known forms of apparatus for this purpose is Green's economizer (Fig. 12), which consists of a number of vertical cast-iron pipes about 4 in. diameter and 9 ft. long, connected at the top and bottom by longitudinal headers, termed boxes. These boxes are connected by top and bottom branch pipes, placed lengthways on opposite sides of the economizer, and on the outside of the brickwork with which

it is encased. The feed-water is pumped into the economizer at the lower branch-pipe nearest the point of exit of the flue gases, and emerges from the upper branch-pipe nearest the point where the flue gases enter. The economizer is situated in a by-pass in the

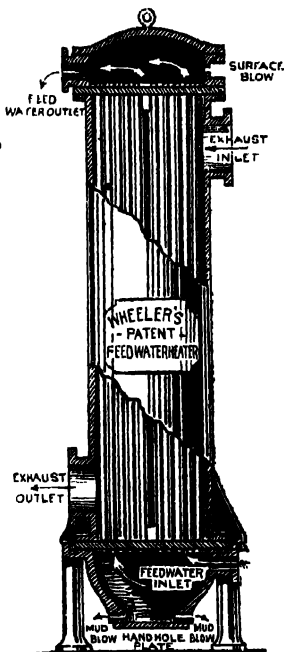
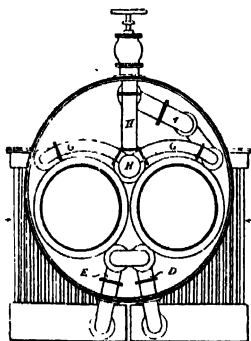


FIG. 13.—Feed-water Heater.

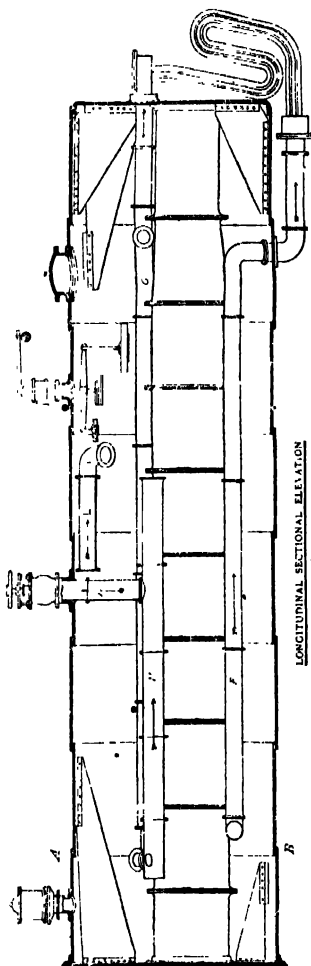
main flue, so that it may be cut off by a damper to allow of inspection without interfering with the working of the boilers. Each tube is provided with a scraper, which is made to travel slowly and continuously up and down, to keep the surface of the tube clear of soot.

There are many forms of feed-water heaters in which the feed-water is heated by means of the exhaust steam from an engine. Wheeler's feed-water heater (Fig. 13), which may be taken as an example, consists of a large number of brass tubes through which the feed-water flows from the bottom to the top of the heater. The heat from the exhaust steam enters at the top and leaves at the bottom. Provision is made at the bottom of the heater for drawing off any mud or other impurities that may collect.

Superheaters.—Fig. 14 shows a dry steam generator and superheater. It consists of a series of steel tubes fixed into top and bottom boxes, placed at the back end of the boiler, so that the furnace gases, on emerging from the internal flues, impinge on the internal tubes and boxes while passing through the down-take on the way to the bottom flue of the boiler. The saturated steam is conveyed from the anti-priming pipe I, by means of pipe A, into the upper part of the superheater C, from which it passes through pipes D and E, below the boiler furnace tubes,



SECTIONAL ELEVATION At A B

LONGITUDINAL SECTIONAL ELEVATION
FIG. 14.—Superheater.

to the lower part of the superheater F, whence it is conducted by the pipes G and H through the steam space to the stop-valve. In this way the superheated steam gives up some of its surcharged heat to the water and steam in the boiler, thus increasing its evaporative capacity, and finally leaving the boiler with a certain amount of superheat. When highly-superheated steam is required, a direct-fired superheater is generally used, consisting of a battery of tubes heated by a special furnace. As a rule, steam with a considerable amount of superheat requires engines of special design.

Mechanical Stokers.—Many appliances have been devised for the mechanical supply of coal to boiler furnaces, and there is no doubt that better results are obtained by the use of mechanical stokers, provided there is a steady load on the engines, and therefore on the boilers. There are two kinds of mechanical stokers, termed 'coking' and 'sprinkling.' A coking stoker pushes the coal on to a moving fire-grate, at the front of which a fire is formed from 8 to 12 in. thick, which burns gradually thinner as it moves to the end of the fire-bars. A sprinkling stoker spreads the coal in thin layers evenly over the surface of a fire from 3 to 4 in. thick.

An interesting form of coking stoker is shown in Fig. 15, as applied to a Lancashire boiler (part of the view is in section). A coal-hopper, H, communicates with a conveyor pipe or trough, T, placed longitudinally under the fire-grate R, which is highest at the centre. The coal, as it is fed into the trough from the hopper, is forced to rise evenly and continuously throughout the length of the furnace by means of a tapered conveyor screw or worm, which is driven independently by

a small steam motor contained in a casing, A. The upper edge of the fuel magazine is surrounded by tuyère sectional blocks, which are provided with openings for the discharge of air both inwardly and outwardly. The air is supplied at a low pressure (from $\frac{1}{2}$ to $1\frac{1}{2}$ in. of water) by means of a blower, through a pipe, P, which communicates with an air-chamber, E. The tuyères are angular in section, and act as fire-bars; they practically overlap each other, and prevent any ash from falling into the air-

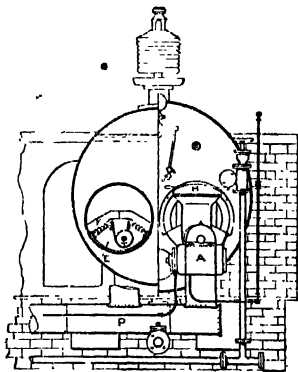


FIG. 15.—Mechanical Stoker.

chamber. The quantity of fuel fed into the furnace can be regulated by varying the speed of the steam motor; the supply of air is also under control. The coal, as it rises in the magazine, becomes heated, and the more volatile products are driven off; these become mixed with air, and are completely consumed by the incandescent fuel on the upper part of the grate, the coal becoming gradually converted into coke as it reaches the fire-level. The under-feed stokers can be applied to any type of boiler.

Procter's mechanical stoker (Fig. 16) is of the sprinkling type. Coal from a hopper, 1, falls into a box, 2, from which a charge is forced from time to time by a ram, 5, and deposited in front of a radially-acting shovel, 4. The shovel is fixed to a shaft, controlled by a tension spring, which exerts sufficient force to propel the fuel on to

justable throw crank, slotted lever, c, and rocking shaft, B. The bars are protected from being burned at the back by a bearer, F, through which steam is allowed to circulate.

Forced Draught.—The Meldrum furnace (Fig. 17) is specially designed for consuming cheap, low-class fuel, such as coal dust, coke dust, etc., which can only be

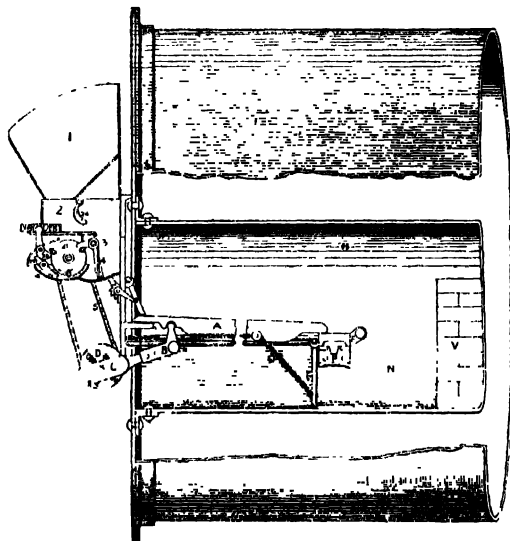


FIG. 16. —Procter's Mechanical Stoker.

the grate, when a projecting piece at the back of the shovel is released from contact with a tappet on the face of a wheel, 21. The above tappet wheel, which receives its motion through gearing from a countershaft, actuates the ram as well as draws back the shovel against the action of the spring. The bars are made to move backward and forward alternately by means of an ad-

justable throw crank, slotted lever, c, and rocking shaft, B. The bars are protected from being burned at the back by a bearer, F, through which steam is allowed to circulate. The Meldrum furnace (Fig. 17) is specially designed for consuming cheap, low-class fuel, such as coal dust, coke dust, etc., which can only be burned with good results when the fire-bars are close together and the air is supplied at considerable pressure, much beyond the power of ordinary chimney draught. The system of forced draught as used in this furnace is the one generally adopted for land boilers of all types. Two steam-jet blowers, J, are fixed on the front of a closed ashpit, and project under the fire-grate of

the furnace. The blowers are tubes, which extend to about one-third the length of the fire-grate, with enlarged trumpet-shaped inner ends, and are provided at the outer ends with steam nozzles or injectors. The steam for actuating the blowers is first superheated by being passed through a superheater, S, shown partly in section. The whole air-supply is under control, so

of a flap-valve, and can be raised slightly by moving a lever, L; a thin stream of air is thus allowed to pass immediately over the fuel, supplying the necessary air to complete the combustion of the distilled gases: when distillation ceases the valve is closed. The above arrangement is introduced for the purpose of preventing the formation of dense black smoke, to which some fuels

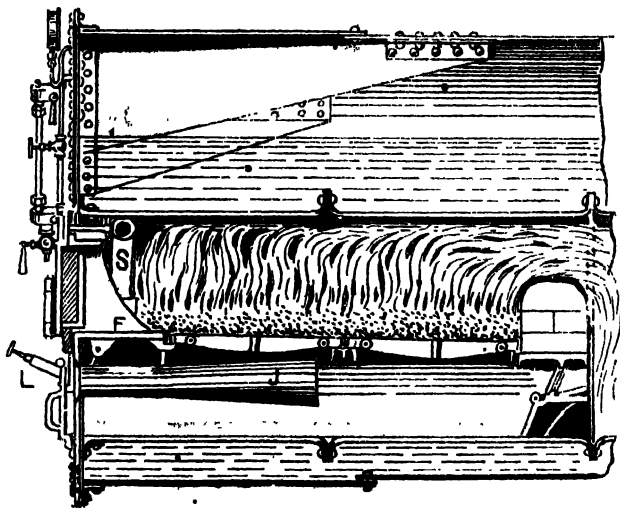


FIG. 17.—Meldrum Furnace.

that the fire may be forced or slackened at will. The fire-bars are made interlocking to prevent displacement, and are spaced about one-sixteenth of an inch apart, so as to prevent anything but the finest dust from falling through. The action of the steam and air on the bars prevents clinker adhering, and thus prolongs their life. The front part of the dead plate F is in the form

are liable. Numerous tests have shown that the evaporative power of boilers fitted with forced draught on the Meldrum system has been increased fifty per cent. as compared with the results obtained in an ordinary furnace when using the same fuel, and without any loss of efficiency. Mechanical stokers are now adapted to Meldrum's furnaces with very satisfactory results.

Forced draught on Howden's principle is applied to most of the boilers in the British navy, and to many boilers in the mercantile marine service. In Howden's system the air to the furnace is heated by being passed through a series of tubes placed in the path of the escaping products of combustion; the ashpit is closed, and the hot air is supplied to the fire both above and below the fire-grate. The pressure of the air in the ashpit is from $\frac{1}{2}$ to 1 in. of water, according to the nature of the coal used. In certain systems of induced draught fans are placed in the base of the funnel or chimney, and the air is drawn through the furnace of the boiler.

Boiler Fittings.—Every boiler should be provided with two safety-valves, one of which should be placed beyond the control of the attendant. A stationary boiler is generally fitted with a lever safety-valve and a dead-weight safety-valve. (See Fig. 1.) The same illustration also shows a third safety-valve for indicating low water as well as a too high steam pressure. A safety-valve should not permit the pressure of the steam in the boiler to rise above a fixed limit; and when the blowing-off pressure is reached, it should discharge steam so rapidly that little or no increase in the pressure of the steam can take place however rapidly the steam may be generated. For locomotives and marine boilers spring-loaded safety-valves are used.

A reliable gauge to indicate the steam pressure is also a necessary adjunct to a boiler; it should be removed from the boiler at regular intervals and tested, for gauges are liable to get out of order when in constant use. A boiler should have two water gauges, one being a check on the other, and a convenience in case of accident to

one gauge. The bottom portion of the gauge should be fixed so that when the water is in sight in the glass there should be sufficient water above the furnace crown, generally from 4 to 6 in.

Most boilers are provided with an injector for feeding them with water, and many have a feed-pump in addition. See *Water-tube Boilers*, by Leslie S. Robertson (1901); *Steam-Boiler Construction*, by W. S. Hutton (1891); *Marine Boiler Management and Construction*, by C. E. Stronmeyer (1901); *Marine Boilers*, Eng. trans. by L. S. Robertson (1905), based on Bertin; *Steam-Boilers*, by G. Halliday (1897). For household boilers, see HEATING.

Boiler Compositions, or ANTI-INCORUSTATORS. The life of a steam-boiler, and its economical working, depend largely on the kind of water used. The most objectionable impurities in water to be used for steam-raising are the bicarbonates of calcium and magnesium, magnesium chloride of calcium sulphate, and, in sea water, common salt. When water containing the bicarbonates is boiled, carbon dioxide is evolved, and calcium and magnesium carbonates are precipitated. Calcium sulphate is probably the worst impurity. It is less soluble in water when under pressure than the carbonate, and, even if present in but small quantities, is deposited, either alone or with the carbonates, as a very hard, coherent scale. Magnesium chloride is decomposed on boiling, with deposition of magnesium hydroxide and liberation of free hydrochloric acid. If carbonates are present, the acid will combine with them, but forms chlorides; if not, it will corrode the steam-pipes and the boiler plates above the water-line. In low-pressure boilers salt water is sometimes used, but as it becomes concentrated the salt is deposited. The

degree of saturation is tested by the specific gravity. With high-pressure and tubular boilers, however, salt water cannot be used, and a distilling apparatus or evaporator is necessary. Peaty waters contain organic acids which destroy the boiler plates, usually at the water-line. The addition of a small quantity of chalk, or the mixture with a proportion of hard water, obviates this difficulty.

A large number of patented anti-incrustation compounds are advertised, the basis of the majority being some form of alkali; but they should never be used unless their composition is known, as also that of the water. The bicarbonates are readily removed by heating the feed-water, where the carbonates are deposited in the heater; or the water may be softened by the addition of lime (Clarke's process). Caustic soda is often introduced into boilers; it combines with the carbonic acid of the bicarbonates, giving sodium carbonate, and precipitates the calcium and magnesium carbonates. The sodium carbonate then reacts on the calcium sulphate, forming sulphate of soda and carbonate of lime. If carbonates are not present in the water, washing soda may be used. These substances are, as a rule, very effective if used judiciously; but if added in excess, they cause the boiler to prime. Their presence prevents corrosion of the plates, and produces a deposit which has little tendency to adhere. Sal ammoniac is sometimes used with success, but its cost is almost prohibitive. One of the most successful of anti-incrustators is tri-basic phosphate of soda, sold under the name of 'tripsa.' It precipitates the calcium and magnesium salts in the water as a slimy mud which does not stick to the plates. It is best introduced in small quantities by

an injector with the feed-water; and the sludge is blown off by the mud-cock once a week. Besides the above saline anti-incrustators, organic substances, such as fats and oils, tannin, paraffin oil, etc., are also used; but with the exception of the last-named substance, which seems to act mechanically, such bodies should be regarded with suspicion.

Boiler Explosions Acts, 1882 and 1890. Under these Acts (which do not apply to a boiler used exclusively for domestic purposes or in the government service) notice of a boiler explosion must be sent to the Board of Trade by the owner or user within twenty-four hours, giving full particulars. The Board may then appoint an engineer to make a preliminary inquiry, or may order a formal investigation by two or more commissioners—one an engineer and one a lawyer—as to the cause of the explosion. The commissioners have the powers of a court of summary jurisdiction, and other special powers. Explosions in ships and mines are usually investigated under the Merchant Shipping and Mines Regulations Acts.

Boiling and BOILING-POINT.

The act of boiling consists in the brisk transformation of a liquid into its vapour form. During the process the heat that is applied to effect the transformation is wholly used up in effecting the change, and the temperature of the liquid remains steady at what is called the boiling-point. Experiment shows that a liquid of definite constitution has the same boiling-point when the pressure is the same, but that with changing pressure the boiling-point changes. Thus, water which boils at 212° F. or 100° C. at normal atmospheric pressure, boils at 40° C. (104° F.) when the pressure is '027 atmosphere, and at 160° C. (320° F.) when the pressure is 6'12

atmospheres. It is possible to reduce the pressure so low as to bring the boiling-point of water almost to the same value as its freezing-point. This is the principle of Leslie's famous experiment, in which water is made to freeze by rapid evaporation in an exhausted receiver. An important practical application of the relation of boiling-point and pressure is the hypsometric thermometer, which enables a traveller with fair accuracy to determine his altitude. By observing the temperature at which water boils he knows at once the pressure of the atmosphere at the station, and from it can estimate the height at which the observation is made to a degree of accuracy determined by a knowledge of the value of the pressure at the sea-level. The relation between pressure and boiling-point in the case of a pure liquid substance is a particular case of the more general proposition, that the maximum pressure of vapour in presence of its liquid is determined by the temperature of the liquid surface. When this pressure of vapour equals the pressure of the atmosphere the liquid boils.

When a liquid contains other substances in solution the boiling-point is generally raised. Thus, it is necessary to raise brine to a higher temperature than 100° C. before it boils; but the steam given off has nevertheless the temperature corresponding to the boiling-point of the pure liquid. When anhydrous calcium chloride is mixed with sufficient water at ordinary temperatures, a chemical solution is formed with considerable evolution of heat, and the solution on cooling crystallizes out. This substance when heated melts, and has a boiling-point which is regulated by the concentration of the solution. During heating, evaporation takes place; so that if more water is not added,

the boiling-point of a particular solution rises appreciably after repeated heatings. It is possible to reach a temperature of 180° by means of a strong solution of calcium chloride.

Boiling. See COOKERY.

Bois-Brûlés, a race of people in N. America, the descendants of Canadian Frenchmen and Indian women; also known as half-breeds, and numbering about 35,000.

Bois Colombes, comm., Seine dep., France, to the N.W. of Paris. Pop. 15,000.

Bois de Boulogne, public park, France (2,158 ac.), ceded by Napoleon III. in 1853 to Paris.

Boise, city, Idaho, U.S.A., the co. seat of Ada co. and cap. of the state; situated on the Boise R., 50 m. above its junction with the Snake R., at an alt. of 2,880 ft. The principal industry is mining. Pop. 6,000.

Boisgobey, FORTUNÉ DU (1824-91), French novelist of the school of Gaboriau, born at Granville in Normandy. For some time paymaster in the Algerian army, he devoted himself from 1868 to the writing of sensational detective novels. As feuilletons for newspapers, several obtained an extraordinary success, especially *L'Homme sans Nom* (1872), *Les Mystères de Nouveau Paris* (1876), and *Le Crime de l'Opéra* (1880).

Bois-le-Duc, tn., Netherlands. See HERTOGENBOSCH, 's.

Boissérée, SULPICE (1783-1854), German writer on art, born at Cologne; became professor of archaeology at Bonn in 1838. With his brother Melchior (1786-1851) he formed (1803-19) at Stuttgart a collection of over two hundred old German pictures, now in the Pinakothek at Munich. His chief works are *Geschichte des Doms von Köln* (1823-32), and *Die Denkmale der Baukunst vom 7 bis 13 Jahrhundert am Niederrhein* (1831-3). See his *Selbstbiographie* (1862), edited by his widow.

Boissier, MARIE LOUIS GASTON (1823-1908), French writer, born at Nîmes; professor of rhetoric at Angoulême (1846-56); became professor of Latin elocution in the Collège de France in 1861, and perpetual secretary of the French Academy in 1895. His works include *Étude sur Terentius Varron* (1861), *Cicéron et ses Amis* (1865; 12th ed. 1902), *L'Opposition sous les Césars* (1875; 4th ed. 1900), *La Religion Romaine d'Auguste aux Antonins* (1874; 5th ed. 1901), *L'Afrique Romaine* (1895); and biographies of Madame de Sévigné (1885; 5th ed. 1901) and of Saint-Simon (1892).

Boissonade, JEAN FRANÇOIS (1774-1857), French classicist, born at Paris; became professor of Greek at Paris (1812), and in the Collège de France (1828). His chief works were *Anecdota Græca* (1829-33), *Anecdota Nova* (1844), and editions of the less known classical writers. His papers were published (2 vols. 1863), with biography, by Naudet.

Boissy d'Anglas, FRANÇOIS ANTOINE, COMTE DE (1756-1826), French statesman, born at St. Jean le Chambre, in Ardèche. He was elected a deputy of the States-general, became a member of the Convention, opposed the execution of the king, and helped to overthrow Robespierre in 1794. He became secretary to the National Convention in the same year, and was afterwards a member of the Committee of Public Safety, and president of the Council of Five Hundred. He was created a senator (1805) by Napoleon, and a noble by Louis XVIII. He wrote *Recherches sur la Vie.....de Malesherbes* (1819-21), and *Études Littéraires et Poétiques d'un Vieillard* (1826).

Boito, ARRIIGO (1842), Italian composer and poet, was born at Padua. After receiving a musical education at Milan, Boito, with a fellow-pupil, Faccio, composed a

cantata, *Le Sorelle d'Italia* (1862), which achieved enormous success. After a period spent in travel, Boito in 1868 produced the opera *Mefistofele*, which, though first received with coldness, has since established itself as a favourite in Italy and elsewhere. Boito writes his own librettos, and has done the same for other composers (*Gioconda* for Ponchielli, *Otello* and *Falstaff* for Verdi, etc.). As a poet he uses the *nom de plume* of Tobia Gorrio, and has written a *Libro dei Versi* remarkable for its realism. He is also the author of an epic (*Re Orso*, 1877) and of some weird tales, and is highly esteemed as a musical critic. Two later operas of Boito, *Ero e Licandro* and *Nerone*, have not been produced.

Bojador, CAPE, on the W. coast of Africa, in 26° 7' N. lat.

Bojan, tn., Bukowina, Austria, 8 m. E. of Czernowitz. Pop. 6,700.

Bojano, tn. and episc. see, Italy, in prov. of and 11 m. S.W. of Campobasso. Pop. 6,500.

Boke, a fortified station of W. Africa, in French Guinea, on the Nunez R., about 50 m. from its mouth, and at the head of navigation (on a high tide).

Bokelmann, CHRISTIAN LUDWIG (1844-94), German painter; born at St. Jürgen, near Bremen; began to paint after spending ten years in business. His canvases display realistic conception, a fine eye for character, and telling arrangement. In 1893 he was appointed professor at the Academy, Berlin. Among his best known works are *In the Pawnshop* (1875), in the National Gallery at Stuttgart; *An Itinerant Stall before Christmas* (1878); *The Emigrants* (1882), in the Museum at Dresden; *The Gaming Tables at Monte Carlo* (1884); *The Opening of the Will* (1879), in the National Gallery at Berlin; and *The Arrest* (1881), in the Museum at Hannover.

Bokhara, or BUKHARA. (1.) The khanate of, a vassal state of Russia in Central Asia, with an area of about 83,000 sq. m., and a population estimated at about 1,250,000, mostly congregated in the oases (Bokhara, Shaar, Karshi, Khuzar, and along the Oxus). Uzbeks are most numerous, and to them the reigning house belongs; next come the Tajiks and Galkhas, Persians, Hindus, Afghans, Kirghiz, Turcomans, etc., with a small but increasing colony of Russians along the line of the Transcaspian Railway. The khanate is bordered on the N. by the Russian provinces of Amu Daria, Samarkand, Fergana; on the E. by Russian Pamir; on the S. by Afghanistan; and on the W. by the Russian Transcaspian province and the vassal khanate of Khiva. Ten per cent. of the area is cultivable, the plain of Zerafshan is very rich, and in the mountainous E. there are signs of valuable mineral deposits. Hissar, in the centre, and Karategin and Darvaz, in the E., are the chief subdivisions. Camels, horses, and sheep form the principal wealth of the state; corn, tobacco, fruit, and cotton are extensively raised. The import of tea, indigo, muslins, etc., from India is considerable, but excessive import duties greatly restrict trade. The Oxus, which runs along the whole S. border, and the Transcaspian Railway, which crosses from S.W. to N.E., are the chief means of communication; the rest of the country is served by caravan routes. The only towns worth mentioning besides Bokhara are Karshi, Kermineh, Charjui, Hissar, Shahr-i-Zabz, and Khuzar. The Uzbeks, from the steppe between the Ural and the Volga, ruled Bokhara and Samarkand after 1505, when Baber, the last Samarkand Timurid, was expelled. In 1868 Bokhara fell under Russian

domination, and by the treaty of 1873 Russia now represents Bokhara in all foreign relations. Prior to the Russian conquest the khanate was more than twice its present size, and, both politically and religiously, was regarded as the leading native state of Central Asia. It was the scene of a destructive earthquake in Jan. 1911. See CENTRAL ASIA (RUSSIAN). (2.) Capital of the above, lies in the lower valley of the Zerafshan, in the midst of trees, gardens, and orchards. It is surrounded by a wall twenty feet high, pierced by twelve gates. The waters of the Zerafshan are distributed by canals, and the city contains well-built bazaars, colleges for Mohammedan students, and many mosques. Tajiks, most of whom are artisans, form three-fourths of the population; the rest are Uzbeks, Jews, Hindus, Kalmycks, and Afghans. Bokhara was a centre of Moslem civilization in the 9th and 10th centuries, and became an Asiatic capital under the Uzbek khans. Pop. est. at 80,000. Most of the Russian colonists and merchants are settled at New Bokhara, on the Transcaspian Railway, 10 m. S.E., and to which there is a short railway. Pop. 2,000. See Vambery's *Travels in Central Asia* (1864), *Sketches of Central Asia* (1867), and *History of Bokhara* (1873); Veniukov's *Frontières Russes en Asie* (1873); Yavorsky's *Reise in Afghanistan und Bokhara in 1877-9* (2 vols. 1885); Bonvalot's *En Asie Centrale* (1885); Moser's *A travers l'Asie Centrale* (1885); Lansdell's *Russian Central Asia* (1885); Carzon's *Russia in Central Asia* (1889); Galkin's *Bouklara* — military study (1890); Le Mesurier's *From London to Bokhara* (1889); and O'Donovan's *The Merv Oasis* (1889).

Boksburg, tn., Transvaal, S. Africa, 15 m. E. of Johannes-

burg; an important coal and gold mining centre. Pop. 30,000 (8,000 Europeans).

Bol, FERDINAND (1616-80), Dutch painter; born at Dordrecht; the most distinguished of Rembrandt's pupils. He first painted portraits after Rembrandt, and later came under the influence of the Flemish historical painters. Some of his pictures are at the Hermitage, St. Petersburg. His chief work is *The Regents of the Leprosy Hospital* (Amsterdam, 1649). Of other pieces, Amsterdam possesses a portrait of Admiral Ruyter; the National Gallery, London, has the *Portrait of an Astronomer*; the Liverpool Institute, the Wallace Collection, the Louvre and many other continental galleries (especially Dresden) possess Scriptural and allegorical pictures. See Cole's *Old Dutch and Flemish Masters* (1895).

Bolama, isl., W. Africa, one of the Bissagos Archipelago; belongs to Portugal. Pop. 4,000. Its largest town, Bolama, is the capital of Portuguese Guinea.

Bolan Pass, a narrow gorge, hemmed in by steep cliffs, leading in a N.W. direction from the plains of Karachi (Kutch Gandawa) across the Hala Mts. to the highlands of Sarawan, Baluchistan. The pass is about 60 m. long, and its summit is 5,900 ft. above sea-level. It is traversed by a military road which repeatedly crosses the Bolan R., and since 1886 by the railway (cogged in parts) between Sibi and Quetta.

Bolaram, military cantonment, 11 m. N. of Haidarabad, Nizam's Dominions, India. Alt. 1,800 ft. Health resort for Haidarabad and Secunderabad. Pop. about 10,000.

Bolas, a hunting instrument used in Mexico and S. America. It consists of a raw-hide rope, to the end of which are attached by separate thongs three heavy balls covered with leather. The weapon

is thrown at a running animal so as to entangle its feet and thus bring it down.

Bolbec, tn., dep. Seine-Inférieure, France, 20 m. by rail N.N.E. of Havre, with cotton and wool spinning, weaving, dyeing and bleaching, paper-making, and tanning. Pop. 11,500.

Boldrewood, ROLF, the pseudonym of THOMAS ALEXANDER BROWNE, Anglo-Australian novelist, who was born in London in 1826. He settled in Victoria as a squatter in 1844, and became a police magistrate and warden of the New South Wales gold fields, a post which he held till 1895. His first and best work of fiction was *Robbery under Arms* (1888). His other works include *The Miners' Right* (1890), *The Squatter's Dream* (1895), *Plain Living* (1898), *The Babes in the Bush* (1900), *The Last Chance* (1905), and *A Tale of the Golden West* (1906). In *Old Melbourne Memories* (1895) he has given a vivid account of his early experiences as a squatter.

Bole, an earthy, finely pulverulent mineral, mostly brown, but in some varieties red or yellow, found in the cavities of basaltic igneous rocks. It is employed chiefly as a pigment, and was formerly used in medicine. It is found in the Greek island of Lemnos, in Sicily, Armenia, Silesia, and S. America.

Bolero, a Spanish national dance in three-four time for two persons, danced to the accompaniment of castanets. It dates from the end of the 18th century.

Boletus, a genus of mushroom-like fungi, including many species of various colours. Most of the species are edible, though the flesh of the cap only is eaten; but a few are poisonous.

Boleyn, ANNE (1507-36), second wife of Henry VIII. and mother of Queen Elizabeth, was the daughter of Sir Thomas Boleyn and his wife, Lady Elizabeth Howard,

daughter of the Duke of Norfolk. She was a comely brunette, with long black hair and beautiful eyes. Henry VIII., in order that he might marry her, took steps to procure a divorce from Catherine of Aragon, and privately married Anne on Jan. 25, 1533. The new queen was crowned in June, and in the following September gave birth to a daughter, Elizabeth. But the king was disappointed that she did not bring him a male heir. In May 1536 Anne was committed to the Tower, on a charge of treason and adultery. Her alleged accomplices, who were all apprehended and executed, were her brother, Lord Rochford, Sir Henry Norris, Smeaton, a musician, and Brereton and Weston, gentlemen of the bedchamber. Anne was doubtless guilty of indecorous conduct, but the more serious charge against her was not really proved. She was beheaded on May 19, 1536, on Tower Green. See Strickland's *Lives of the Queens of England* (1875-80); Froude's *Hist. of Eng.* (1871); Hepworth Dixon's *Hist. of Two Queens* (1873-4); Friedmann's *Anne Boleyn* (1884). Round's *Early Life of Anne Boleyn* (1886).

Bolgary, BOLGHAR, or BOLGARA, vil., Kazan gov., Russia, on the r. bk. of the Volga, 60 m. s. of Kazan, on the site of the ancient capital of the old Bulgarians. The town was destroyed by Tamerlane in the 14th century. Here, during excavations begun in 1722, many ancient coins and inscriptions were found. The Bulgarians of Bolgary were converted to Islam about 920, and were subsequently visited by Moslem travelers, especially Ibn Batuta, about 1335. During these ages Bolgary was an entrepôt of trade between Scandinavians, Russians, and other Europeans to the w. and n.w., and Khazars and Moslems to the s. and s.e.

Bolgrad, tn., Bessarabia, Russia, 25 m. n. of Ismail. Pop. 12,000.

Boll, tn., Turkey in Asia, vilayet Kastamuni, 86 m. n.w. of Angora; warm springs. Pop. 10,000.

Bolingbroke, HENRY ST. JOHN, VISCOUNT (1678-1751), English statesman, entered Parliament as member for Wootton-Bassett in 1701, where he soon acquired an important position on the Tory side. In 1704 he became Secretary for War in the Godolphin ministry, retiring from office three years later with Harley. On Harley's return to power, as Chancellor of the Exchequer, in 1710, St. John became Secretary of State, with the management of foreign affairs. In 1713 he concluded the unpopular treaty of Utrecht. He had been created Viscount Bolingbroke in 1712. To counteract the close connection between the Whigs and the Hanoverian court, he intrigued with the Pretender; but it is probable that his real object was to be in a position, on the death of Anne, to dictate terms to either party. The queen's sudden death frustrated his schemes; he was dismissed from his offices, and in the following year was impeached and attainted (1715). He had already fled to France. For a brief period he was secretary of state to the Pretender; but he protested against the rising of 1715, and was soon afterwards dismissed. During his exile he wrote *Reflections upon Exile* (1716), and the *Letters to Sir W. Windham* (1717), an interesting piece of autobiography. In 1723 he procured a pardon from George I., and in 1725 his estates were restored. He settled at Dawley, near Uxbridge, where he attacked the ministry in a series of letters in the *Craftsman*, reprinted (1735) as a *Dissertation on Parties*. In 1735 he retired to France, and employed

his leisure in writing a *Letter on the True Use of Retirement*, and *Letters on the Study and Use of History*. The *Letters on the Spirit of Patriotism* and *The Idea of a Patriot King* were written in 1738. He died in England. Bolingbroke, unsurpassed as an orator, was handsome in person and of polished manners and cultured wit. His knowledge of foreign affairs, his capacity, and his ready eloquence would have qualified him to be a great statesman, but for his insincerity and love of intrigue. His collected works were published in 1754, in 1778, and again in 1809. See *Life* by Goldsmith (1770) and by Thomas MacKnight (1863); *Bolingbroke: an Historical Study*, by J. Churton Collins (1886); *Life of Viscount Bolingbroke*, by Arthur Hassall (1888), in the 'Statesman Series'; and *Life* by W. Sichel (1901-2).

Bolintineanu, DIMITRIE (1826-72), Roumanian poet, born at Bolintin, near Bucharest. He founded the *Dimboritza* (1861), in which he vigorously sustained the popular cause against the boyars, and was minister of education in 1864, when Prince Cuza introduced his popular reforms. Bolintineanu's works, which include some of the best poetry in the language, are the collections *Cantece si Plangeri*; *Legendele Nationale*; *Basmele*; *Florile Bosforului*, etc. They were collected and published in 1877 in 2 vols. A French translation, under the title *Brises d'Orient*, appeared at Paris in 1866.

Bolívar. (1.) State of Venezuela, extending along the S. bank of the Orinoco and Apure. The products are chiefly those of the Orinoco forests—e.g. copaiba balsam, india-rubber, and tonka beans; other products are tobacco, coffee, and cinchona. Cattle are herded on the llanos. Cap. Ciudad Bolívar. (2.) Province of Ecuador, S. America; largely un-

developed and densely covered with forests. Pop. 43,000. Cap. Guaranda.

Bolívar, SIMON (1783-1830), 'the Liberator,' was born at Caracas, in the Spanish colony of New Granada, S. America, of a noble Spanish family. He was educated at Madrid. After a visit to the United States in 1809, he threw himself with ardour into the movement for making the colony independent of the mother country. After the abortive insurrection of Caracas in 1810 he proceeded to London; but the British government decided to maintain a neutral policy. Bolívar's party having issued a Declaration of Independence in 1811, a long struggle for the mastery ensued between Spain and her recalcitrant colonists. In 1819 the Congress of Angostura having invested Bolívar with the chief command, he fought the decisive battles of Tunja and Boyaca, and proclaimed the new 'republic of Colombia,' which term embraced the whole territory subsequently (1832) divided into the republics of Venezuela, the United States of Colombia, and Ecuador. The war, however, continued until 1821, when it practically concluded with Bolívar's victory at Carabobo. On August 30, 1821, the constitution of Colombia was adopted, and Bolívar was elected president. He next proceeded to effect the independence of Peru, of which country he was chosen (1824) dictator, as he was also of Bolivia, likewise freed in 1825. The closing years of Bolívar's life were marked by the unworthy suspicions and intrigues of his co-republicans. Ultimately, however, he was no longer spoken of as a Napoleon, but as a Washington, who had spent his energies and his wealth to secure the liberties of his countrymen. See the *Mémoires de Bolívar*, by Ducoudray-Holstein (1830); Rojas's *Life*, in

Spanish (1883); De Schrijver's *Esquisse de la Vie de S. Bolivar* (1899); and Loraine Petre's *Bolivar* (1910).

Bolivia (named after Bolivar), republic in S. America, bounded on the E. and N. by Brazil, on the W. by Peru and Chile, and on the S. by the Argentine Republic. It has an estimated area of between 500,000 and 600,000 sq. m. The W. part of the republic is a tableland (10,000 to 12,000 ft.) lying between the cordilleras of the Andes, while the E. part consists of low plains sloping down to the rivers Madeira, Guapore, and Paraguay, and crossed by a few conspicuous mountain ranges. The tableland is drained into Lakes Titicaca and Poopo, and the centre and north belong to the basin of the Amazon. The S. section lies in the Paraguay basin, and is drained chiefly by the Bermejo and the Pilcomayo. The plateau region is cold, dry, and healthy. La Paz, in an upland valley of the Andes, has a mean annual temperature of 52° F., the mean extremes being 64° and 36°. The average rainfall is about 24 in., most of it falling during summer. The S. part of the plateau, receiving much less rain, is very arid, and is subject to frequent sandstorms. The E. slopes of the Andes have a tropical climate and abundant rainfall. Farther N., in the Beni department, are vast pasturages (the Mojos llanos), where large numbers of cattle are grazed. Agriculture thrives in the Yungas ('hot valleys'), the E. slopes of the Andes, and in the S. Coca, coffee, and cinchona are the chief crops; india-rubber is collected in the plains of the Amazon; and wheat, barley, and potatoes are grown on the plateau. The llama, alpaca, vicuña, viscacha, fox, and chinchilla are the principal mammals. On the E. side of the Andes the fauna is that of the Brazilian sub-region.

As a silver-mining country Bolivia formerly held a high place, but the output, chiefly from the Huanchaca mine, is at present small. Copper mines extend from Lipez, in the extreme S., through the Potosi department, Oruro, and Corocoro. The districts of Oruro, Potosi, and La Paz are rich in tin—the most important article of export (over £2,000,000 annually)—and bismuth. The gold-bearing regions are along the western border, the region of Atacama, and the N.E. portion of the country near the Peruvian border. About three-fourths of the inhabitants of Bolivia are Indians and half-breeds (Cholos). Their occupations are mining, agriculture, and grazing; manufacturing industry is little developed.

In 1879 Chile took possession of the Bolivian coast lands, and the country has now no ports. Its exports are carried to Mollendo (Peru), Arica, and Antofagasta, at which places Bolivian customs agents reside. A river port was opened at Puerto Alonso (now Acéré) on the Acéré in 1899 (since ceded to Brazil), and it is proposed to form another (Puerto Quijarro) on the Gaiba lagoon, and connect it by a railway (380 m. long) with Santa Cruz. The principal railway is that from Antofagasta to Oruro (298 m. in Bolivia). There are also lines from Oruro to La Paz and Oruro to Potosi, and other lines are under construction and projected. Much of the traffic is by mules and llamas, and in the N. by means of the rivers. Most of the india-rubber is carried down the Acéré and Madeira, the total production of which is valued at £700,000 annually. The value of the total exports is about £4,500,000, and of the imports about £3,000,000. Formerly Peru and Chile secured a large proportion of the trade through special exemptions from duties, but these

privileges were put an end to by the commercial treaty of July 1, 1906. The government consists of a president and two vice-presidents (elected for a term of four years), a senate of sixteen members, and sixty-nine deputies. The country is divided into the Territorio de las Colonias and eight departments. The supreme court sits at Sucre, the usual seat of government, though sometimes it meets at La Paz. The foreign debt has been taken over by Chile. The Roman Catholic religion is alone recognized by the state. Pop. estimated at over 2,000,000.

After the battle of Ayacucho, in 1824, Bolivia gained its independence. The Colombian general Bolívar made his entrance into La Paz in 1825, and under his auspices the first constitution was drawn up in 1826. Since then the chief event in the history of Bolivia has been the loss to Chile of the coast province of Antofagasta, with its valuable nitrate deposits (1879-84). The boundary dispute with Brazil as to the territory of Acre was settled in November 1903, when, in return for Upper Acre, Upper Purus, and Upper Jurua as far as 11° s., comprising about 74,000 sq. m., Bolivia acquired territory on the frontier of Matto Grosso and the river Madeira (1,220 sq. m.), together with a compensation of £2,000,000 and commercial facilities. See M. V. Ballivian and E. Idiaquez, *Diccionario Geografico de la Republica de Bolivia* (1890); F. Blanco, *Diccionario Geografico de Bolivia* (1901); Sir M. Conway, *The Bolivian Andes* (1901); Matzenauer, *Bolivia* (1897); Payne and Wilson, *Pioneering in Bolivia* (1905); Suarez, *Notes on Bolivia* (1902); and Marie Wright, *Bolivia* (1907).

Bolkhov, tn., Orel gov., Russia, 37 m. N. of Orel; important tanneries; trade in agricultural produce. Pop. 22,000.

Boll, a measure of capacity for grain, etc., used in Scotland and the north of England, containing in the former generally six imperial bushels, but in the latter varying locally from the 'old boll' of six bushels to the 'new boll' of two bushels. For its local values, see *Old Country and Farming Words* (English Dialect Society, 1880), p. 168. As a weight, a boll represents 140 lbs. avoirdupois. By an act which came into operation on Jan. 1, 1879, these and all other local weights and measures were abolished, imperial weights and measures taking their place. 'The A.S. *bell*, *bolle* = any round vessel, is our 'bowl.'

Bollandists. See ACTA SANCTORUM.

Bollene, tn., Vaucluse dep., France, 25 m. N. of Avignon; with silk industries. Pop. 5,700.

Bollington, eccles. par. (1,291 ac.) and tn., 2 m. N.N.E. of Macclesfield, B. Cheshire, England; has cotton manufactures and calico printing. Pop. 5,300.

Bollullos par del Condado, tn., Spain, prov. of and 20 m. E.N.E. of Huelva. Pop. 8,000.

Bologna. (1.) Province (area, 1,448 sq. m.), Italy, lying between middle Apennines and lower Po. To s. of Via Emilia, on which stands the cap. Bologna, are the slopes and valleys of the Apennines, and N. of it is the fertile, well-watered valley of the Po. Its chief manufactures and industries are those of the city. Wheat and maize are largely grown. Pop. 545,000. (2.) Anc. *Bononia*, cap. prov. Bologna, Italy, and an archiepiscopal see, at the foot of the Apennines, 135 m. S.E. of Milan. All the railways of that part of Italy converge on Bologna, which stands on the ancient Via Emilia, and consequently in a strategical position necessitating fortification (since 1860). The city has fine broad streets, the older central parts containing many churches,

towers, and palatial dwellings. In the centre is the square of Victor Emmanuel, with communal palace and palace of the podestà, both dating from the 13th to the 16th century. In the Neptune Square are the Italian Gothic church of San Petronio (1390-1659) and the cathedral of St. Peter (founded 910, and rebuilt 1605). The leaning towers—Torre Asinelli and Torre Garisenda—belong to the 12th century. In the E. of the city are the university (founded in 1200, and attended by 1,700 students) and the Academy of Fine Art, containing works by Guido Reni, Doménichino, Francesco Albani, the Carracci, and Guercino (founders of the Bolognese school). Outside the city stand the Certosa (1335) and the pilgrimage church of the Madonna of St. Luke. The surrounding district is fertile. Trade and manufactures are both very active, the principal productions being hams, sausages, perfumery, soap, lace, artificial flowers, macaroni, liqueurs, preserved fruits, silks, cloth, hemp textures, glass, tobacco, and hats. Pop. 165,000. Bologna is the birthplace of the painters already named, and of Francia, Galvani, and Rossini.

Bologna, originally an Umbrian town (*Felsina*), was conquered by the Boii, and called Bononia. In 189 B.C. it was made a Roman colony, and became the residence of the Roman emperors. In the middle ages the university was famous as a school of jurisprudence, and as early as the 14th century women were permitted to teach in its schools. In 1506 Pope Julius II. incorporated the city in the Papal Estates, and in 1860 it became part of the modern kingdom of Italy. See Burton's *Etruscan Bologna* (1876), Hare's *Cities of Italy* (1884), and Edith Coulson-James's *Bologna* (1909).

Bologna, GIOVANNI or GIAN (1524-1608), sculptor of the Ital-

ian renaissance, called IL FIAMMINGO, from his birthplace in Flanders; went early (1551) to Florence to study the work of his contemporary Michael Angelo, and worked there for three years under the goldsmith Vecchiotti. His statues are characterized by classic simplicity and nobility of form; the chief are the bronze *Mercury*, in the Bargello at Florence; the *Rape of the Sabines*, in the Loggia dei Lanzi at Florence; and the equestrian statue of Cosimo I. (1594), grand-duke of Florence. He also designed the fountain of Neptune at Bologna, and the bronze gates for the Pisa cathedral (1595). His colossal group of *Samson Killing the Philistines* is at Hovingham Hall, Yorkshire. See C. C. Perkins's *Historical Handbook of Italian Sculpture* (1883), and Desjardins's *La Vie et l'Œuvre de Jean Bologna* (1884).

Bologna Stone, known also as BOLOGNA PHOSPHORUS. At Monte Paterno, near Bologna, are found certain concretions of barytes which, after being heated in a crucible with charcoal, phosphoresce upon exposure to light. This mineral, ground to fine powder, mixed with gum, and heated, yields a paint which is employed on account of this property. Celestine (sulphate of strontium) gives similar results.

Bologoi, tn., Novgorod, Russia; important railway junction between St. Petersburg and Moscow, and 200 m. N.W. of the latter.

Bolometer ('ray-measure'), an instrument invented by Professor Langley of Washington for the detailed measurement of radiant heat. The principle of its construction is the change of electrical resistance which is produced in metallic conductors by variations of temperature. Thus, the exposure to heat of a platinum filament forming one of the arms of a Wheatstone bridge disturbs

the electrical balance; a current is set up, and the galvanometer needle is deflected. By this means Langley discovered, from the summit of Mount Whitney in 1883, an invisible range of heat rays outcupling the extent of the visible solar spectrum, and including nearly three-fourths of the energy that reached the earth from the sun. In his improved apparatus, erected at the Smithsonian Astrophysical Observatory in 1892, all the movements are automatic. The sun's rays, collected by a large siderostat, are transmitted through a rock-salt prism, and the infra-red part of the spectrum thus formed is made to travel by means of clockwork in front of a bolometric strip one-twentieth of a millimetre wide and one-thousandth of a millimetre thick. The ensuing electrical effects record themselves through the movements of a speck of light which is thrown from a mirror attached to the galvanometer upon sensitized paper shifted at a steady rate. The curves traced as the outcome of the process are termed 'bolo-graphs'; they show, by their heights and hollows, the alternations of temperature due to absorption. From the materials furnished by them Langley has mapped about 750 lines below the red, mostly of telluric origin (*Annals of the Smithsonian Observatory*, vol. i., 1900). His perfected bolometer records differences of temperature not exceeding one ten-millionth of a degree centigrade.

Bolor-tagh, mt. range of Central Asia, reaching altitudes of 24,000-26,000 ft. See PAMIRS.

Bolsena. (1.) Small tn., prov. Rome, Italy; stands on the N.E. shore of the Lake of Bolsena, 9 m. S.W. of Orvieto; has remains of the ancient *Volsinii Novi*. (See ORVIENTO.) Here occurred the so-called 'miracle of Bolsena' (1263),

an appearance of blood on the Host which had just been consecrated by a Bohemian priest, an unbeliever in transubstantiation. Pop. 3,300. (2.) Lake, Italy, about 55 m. N.W. of Rome, the centre of a volcanic district, but probably not itself an extinct crater, 1,000 ft. above sea-level, 480 ft. deep, about 10 m. long and 8 m. broad. Its cels are mentioned in Dante's *Purgatorio*, xxiv. 24.

Bolsover, par. and tn., 6 m. E. of Chesterfield, Derbyshire, England; has coal mines and magnesian limestone quarries which supplied the stone for the Houses of Parliament. Pop. 7,000.

Bolsward, tn., prov. Friesland, Netherlands, 15 m. by rail S.W. of Leeuwarden: has trade in cheese and butter. Pop. (comm.) 6,500.

Bolt, any metal pin which unites parts of structures or machines. Temporary bolts are fixed to doors, windows, etc., and are operated by a key or the hand. Permanent bolts take various shapes, according to their use: in shape they may be round, square, hook-and-eye, etc. According to their use they may be foundation, rail, tyre, shackle, and so forth. The commonest form of bolt has a head and a screw-thread towards the end; it is fastened up with a loose nut. In shipbuilding, bolts which completely penetrate a structure are *through bolts*, and those which only partly do so are *blind bolts*. Eye bolts have a hole in the projecting end; a ring through this hole turns the eye bolt into a ring bolt. The Lewis bolt is an eye bolt with a barbed shank fixed into a socket on the deck.

Bolt Head, cape, S. Devonshire, England, at W. side of mouth of riv. Salcombe. Here is a government wireless telegraphy station.

Bolton, or BOLTON-LE-MOORS, par., tn. (incorporated 1838), parli., munic., and co. bor., Lancashire,

England, 11 m. N.W. of Manchester. It is one of the chief centres of the cotton industry, and is especially noted for fine yarns. There are also manufactures of muslins and fine calicoes. Bolton has foundries, iron works, bleaching, paper, and saw mills, and chemical works. In the vicinity are extensive coal fields. In 1337 the Flemings introduced the woollen trade; this was stimulated by further immigrants in 1567, and by French Huguenots in 1685. Arkwright, long a resident in Bolton, and Crompton, a native of the town, invented the spinning-frame and the mule respectively. The chief buildings are the public library, the town hall (1873), the technical school, and the mechanics' institute. The water of the town is obtained from Entwisle Moor, 5 m. distant. Bolton is represented by two M.P.'s. Pop. of parl. bor. 190,000.

Bolton Abbey, eccles. par. and tnsnip. on the Wharfe, 6 m. E. of Skipton, W. Riding, Yorkshire, England (ac. 2,071). There was a priory for Augustinian canons, founded at Embsay about 1121, but it was moved here in 1151. It is now a picturesque ruin; the nave serves as a parish church. The entrance hall of the Duke of Devonshire's shooting-box, Bolton Hall, was the gateway of the priory. Wordsworth's *White Doe of Rylstone* was founded on a tradition connected with the priory. Pop. 750.

Boma, or **M'BOMA**, formerly known as **EMBOMMA** or **LOMBI**, cap. of the Belgian Congo, W. Africa, on the r. bk. of the Congo, about 45 m. from its mouth; harbour formed by Congo and I. of Nkete (1 m. wide; depth from 20 to 66 ft.).

Bomarsund, ancient Russian fortress on E. coast of Åland I., Baltic Sea, at entrance to G. of Bothnia. On Aug. 16, 1854, after a six days' siege, it was taken by

the allied fleets of Britain and France. Russia, by the treaty of Paris, undertook not to rebuild it.

Bomb, in geology. Bombs are large, round, porous masses of igneous rock ejected by active volcanoes, and are found mixed with other varieties of volcanic ash. The blocks are often pear-shaped or flattened, owing to their having been in rapid rotation while hot and viscous during their journey through the air. They are simply a large form of the *lapilli* of which the ash beds principally consist. Masses nine feet in diameter have been thrown a distance of several miles. When such materials have, in course of time, been compacted into firm rock, they are known as volcanic agglomerate. Bombs are sometimes hollow, owing to the expansion of the steam in the molten igneous rock, aided, no doubt, by centrifugal force. See J. Phillip's *Vesuvius* (1869), and other works on volcanoes.

Bomb. See **AMMUNITION**; **EXPLOSIVES**; **DYNAMITE**.

Bomba, KING. See **Ferdinand II.**, king of the Two Sicilies.

Bombala, tn., New South Wales, co. Wellesley, 40 m. N.W. of Twofold Bay, 250 m. S.W. of Sydney. Pop. of tn. 1,000; dist. 4,500.

Bombardier, originally an artilleryman who was skilled in the use of *bombards*; but the term has come to be applied to the lowest grade in the non-commissioned ranks of the royal artillery, and is equivalent to that of corporal in other branches of the army. An acting bombardier corresponds to a lance-corporal in an infantry regiment. The establishment of bombardiers in a battery is four, five, or six in peace, and eleven in war.

Bombardier Beetles (*Brachinus*), interesting insects which receive their name from the remarkable habit of emitting a

discharge from the posterior end of the body when alarmed. The discharge is like a tiny puff of smoke, and is accompanied by an evil odour. The common European form is *B. crepitans*. All the bombardier beetles resemble the common garden carabids in general appearance, and are allied to them.

Bombardment. The object of a bombardment may be either to destroy military stores, arsenals, or dockyards, or to bring about the surrender of a place. It is more often a naval than a military operation. Its effect is too uncertain for it to be relied upon for the latter purpose unless it is combined with a rigorous blockade, or with the operations of a regular siege. The bombardment of a fortress or defensive position prior to an assault being delivered is absolutely essential to success. A place surrounded by sufficiently advanced fortifications is safe against bombardment. In the Franco-German war the distance of the detached forts from the cities or towns they surrounded was so small that on sixteen occasions a very slight bombardment (generally from field guns merely) proved sufficient to bring about surrender. History has shown that the effects of bombardment on the civil population is usually small—about one per cent. only being killed. The Brussels Conference (1874) drew up rules (Arts. 15-18) for the restriction of bombardment to fortified places and towns which actively opposed the enemy. See **BELLIGERENTS, RIGHTS AND DUTIES OF**.

The most terrible bombardment of history was that of Port Arthur during the Russo-Japanese war. On Sept. 1, 1904, the Japanese began the reduction of the fortress by engineering methods—i.e. by 'sapping' and 'mining,' supported by a terrific artillery

fire. Some three hundred guns were trained against the place, and all the infantry assaults were preceded by bombardments. The Japanese used regular siege guns of from 5 to 6 in. calibre, naval guns (4·7 to 6 in.), ordinary field ordnance, and, above all, 11 in. mortars weighing 8 tons apiece without the carriage. These mortars were originally designed for coast defence. They had a bore of 11 in.; their shells, which weighed 500 lbs., were loaded with a high explosive (invented by Dr. Shimose), and burst on contact. Each shell cost £40, and the cost of each discharge was about £100. During heavy bombardments each gun was fired once every eight minutes, and the grand bombardments were kept up about four hours. The mortars had a maximum range of seven or eight miles, but none of them were more than three miles distant from the town. They were fired at angles as great as 60°, 'the huge shells hurtling high into the heavens, passing over two ranges of hills, and falling like thunderbolts out of the blue sky vertically upon the devoted city.' On the whole, the bombardments were conducted with care and humanity. The *Times* correspondent, writing after the fall of the fortress, reported that practically no damage had been inflicted on the many large buildings, the attack being directed mainly to the defences, the storehouses, and the warships in the harbour. It is said that 11,000 of the besieged were killed, but the number of casualties directly traceable to the bombardment is not known. See article by Richard Barry, 'An American Correspondent in Port Arthur,' *Fortnightly Review*, March 1905, p. 459 et seq.

Bombardon. See **SAXHORN**.

Bombay, cap. of the presidency of the same name, is an island in

the Arabian Sea, situated close to the W. shore of India (with which it is connected by three causeways). The mails to and from the West for all India are embarked at and disembarked from this port, which is called 'the Gate of India.' Three main lines of railway have terminal stations in Bombay: by two of these the port is in direct communication with Calcutta, either through the Central Provinces or through Rajputana; the third line runs S.E., *via* the Nizam's Dominions, to Madras. Bombay is the second seaport of India; about one-fourth of all the commerce of the country passes over its quays. The value of the imports and exports (merchandise only) in 1909 amounted to £55,000,000. The commodious and picturesque harbour is dotted with islands. Opposite the anchorage are the fort, and the docks and places of business. The native town lies to the N. On Kolaba, the narrow S. extremity, is the European garrison. A shallow sheet of water on the farther side of Kolaba, called Back Bay, is encircled on the W. by a hilly promontory (Malabar Hill), terraced with houses—the residential quarter.

The climate is humid and enervating. Hindus and Mohammedans are the most numerous of the inhabitants, and include not only natives of India, but also Afghans, Arabs, Malays, and Africans. There are also influential communities of Parsees, Jews, Europeans, and Americans. There are large cotton mills, tanneries, dyeworks, and shops for metalwork.

Bombay is the headquarters of the government of the presidency, over which a high court exercises supreme jurisdiction. Besides a university (over 1,100 students), there are the Government Elphinstone College, three art colleges, the Grant Medical College, two

missionary colleges, a technical institute, and a law school. Numerous high schools and orphanages, initiated by the efforts of Christian bodies, have been extended by the native merchant princes; and several hospitals, including one for lepers, are maintained by its citizens. In municipal enterprise Bombay holds its own with the foremost cities of Europe. Since 1897 annual visitations of bubonic plague have devastated the city, but an extensive scheme of sanitary improvement has been instituted.

Bombay came into the possession of the British crown in June 1661, as part of the dowry of Catherine of Braganza, on her marriage with Charles II. Pop. (1911) 972,892. See Forrest's *Cities of India* (1903).

Bombay Presidency is that portion of India which lies between Baluchistan and the Punjab in the N. and Mysore in the S. The Arabian Sea marks its W. boundary, and on the E. are the native states of Rajputana and the Nizam's Dominions. Its area is nearly 188,800 sq. m., of which about 123,000 are British territory. Pop. about 25,000,000. Two important mountain ranges run through the presidency: the Sahyadri, or Western Ghâts, follow the coast-line from the S. and converge on the Aravali Hills, which are spread over Gujarat; in the extreme N. the Hala Mountains form the dividing line between Sindh and Baluchistan. The three principal rivers are the Indus (which traverses Sindh and enters the Arabian Sea in a wide delta), the Nerbada, and the Tapti, both in Gujarat. The Manchar Lake, on the Indus, has, under inundation, covered an area of 180 sq. m. The Rann of Kutch, an inland lake, becomes, when in flood, an arm of the sea. The country generally is fertile. In Sindh, where there are stretches

of sandy desert, irrigation has brought large tracts under cultivation. Forests are scattered along the mountain ranges, and cover extensive areas on the banks of the Indus. During the fair weather traffic along the coast-line is brisk, but the only harbours are Karachi, Bombay, and Karwar; and native craft cease to ply during the prevalence of the s.w. monsoon. The chief industries are the manufacture of cotton and salt. The volume of trade in cotton, wheat, and oil-seeds, grown in the presidency and gathered from the inland provinces for export to Europe, is considerable; and the export to China of opium and coarser cotton cloths is also important. Three main lines of railway from Bombay tap the Nizam's Dominions, the Central Provinces, and Rajputana; the cotton-growing province of Kathiawar is being covered with a network of lines. A military line from Karachi leads to the northern frontier, and this port is in railway communication with the Punjab and Rajputana. The post office and telegraphs are controlled by the imperial government both in British territory and in native states.

The executive government is vested in a governor and two councillors. For administrative purposes the presidency proper is divided into nineteen districts. Local self-government is in its infancy, but municipalities have been established in the larger towns; and for legislative purposes the executive government is assisted by a council of Europeans and natives.

Of the territories under native rule the most important is Baroda, which is practically under the direct control of the imperial government. In all the native states the British government is represented by political officers. The chiefs have surrendered the

right to manufacture opium, salt, and native intoxicating drinks (*abkari* dues), and the jurisdiction over railway lands. They are responsible for the safety of mails in transit through their territories. The chiefs of Kolhapur, Kutch, and a few in Kathiawar, possess plenary powers.

The inhabitants comprise numerous races, who profess divers creeds. The majority (75 per cent.) are Hindus—a term used to comprehend pure Brahmanism, as well as the worship of Vishnu and Siva under various systems; a small but influential body are Parsees; and the proselytizing faiths are represented by Buddhists, Mohammedans (20 per cent.), and Christians. The languages principally spoken are Marathi (50 per cent.), Gujarati (20 per cent.), and Sindhi (15 per cent.). See Drew's *Bombay and its Feudatories* (1892).

Bombay, Baroda, and Central India Railway. The first portion of this railway (Amroli to Surat), 36½ m. in length, was opened in 1860. It was on the (then) standard Indian gauge of 5 ft. 6 in. At the end of 1905, the railway was purchased by the Indian government. At this date the system consisted of 465 m. of 5 ft. 6 in. gauge railway, 252 m. of which was double track; and 1,816½ m. of metre gauge, 39½ m. of which had been converted from broad gauge. At this date the Bombay, Baroda, and Central India Ry. also worked for the government 141 m. of 5 ft. 6 in. gauge railway, as well as 222½ m. of 5 ft. 6 in. gauge, 271½ m. of metre gauge, and 131½ m. of 2 ft. 6 in. gauge for various native states and private companies. The capital of the company when purchased by the Indian government was £11,007,098, of which £138,838 had been advanced by the Indian Secretary of State.

Since the Indian government

acquired the line, it has been worked for the government by a new Bombay, Baroda, and Central India Ry. Co. with a capital of £2,000,000, increased in Oct. 1908 by the issue of £1,000,000 3½ per cent. debenture stock. The government guarantees interest at the rate of 3 per cent. per annum, and the surplus profit is divided between the government and the railway company, the latter receiving one-tenth up to the sum necessary to pay an additional ½ per cent. interest on the company's capital, and one-fifteenth of any further surplus. For the year 1909 the surplus provided the additional ½ per cent. with £30. At Dec. 31, 1909, the total mileage (including worked lines) was—5 ft. 6 in. gauge, 831·95 m.; metre gauge, 2,710·38 m.; and 2 ft. 6 in. gauge, 131·84 m. The working expenses in 1905—the last year as a private line—were 42·94 per cent. of the gross earnings; for 1909 they amounted to 52·14 per cent.

Bombay Duck, or **BUMMALOTI**, the name given to a fish called *Harpodon nehereus*, in the dried or salted condition in which it is exported from Bombay and the coast of Malabar. It belongs to the family Scopelidae, to which many deep-sea fish belong, and is itself probably a deep-water form coming periodically to the surface. The body is much elongated, with delicate scales and soft bones.

Bombazine, a twilled or corded cloth, manufactured in England as early as the reign of Elizabeth, and composed of silk and worsted. Norwich was the chief seat of the manufacture from about 1816. It is also made in N. Italy.

Bombetoka, **BAY OF**, on N.W. coast of Madagascar, about lat. 16° S. On it stands the seaport of Mojanka.

Bombinator, a genus of toads, including the common fire-toad (*B. igneus*) of Central Europe. It

is a small animal (length about 1½ in.), with a dark protectively-coloured back and splashes of orange-red on the under side of the abdomen. When alarmed it adopts a remarkable attitude which serves to display this bright under surface. In the south and west of Europe another species (*B. pachypus*) occurs, in which the under surface is yellow instead of red.

Bombyx. See **SILK**.

Bommel, or **ZALT-BOMMEL**, tn., prov. Gelderland, Netherlands, on the l. bk. of the Waal, 10 m. N. by W. of 's Hertogenbosch. Pop. of commune, 4,000.

Bommelø, isl., Norway, off the W. coast between Stavanger and Bergen.

Bommelwaard, isl., Gelderland prov., Netherlands, formed by the Waal and the Meuse. It contains the town of Zalt-Bommel and numerous villages.

Bomvanaland, native dist. in Tembuland, Cape of Good Hope, lying on the E. coast between the Bashee R. and Umtata R.

Bon, **CAPE**, or **RAS ADDAR**, northernmost point of Africa, 58 m. N.E. of Tunis.

Bona (Fr. *Bône*), fort. seapt. tn., prov. of Constantine, Algeria, in fertile plain 85 m. N.E. of Constantine, on Sebus R.; it has a fine harbour. The exports include phosphates, iron, zinc, lead, copper, cork-wood, and briar roots. Bona was occupied by the French in 1832. To the S. are the ruins of Hippo Regius, the see of Augustine, who died here in 430. Pop. 42,000 (Europeans 30,000).

Bona Dea ('the good goddess'), a Roman divinity, sister, wife, or daughter of Faunus and named Fauna, Fatua, or Oma. Her worship was exclusively confined to women, and she was revered as a chaste and prophetic deity. Her sanctuary was a grotto on the Aventine Hill. On May 1 of every year her festival was held in the

house of the consul or prætor. Also, on the night of Dec. 3-4, a distinct rite was celebrated by women only in the house of either the consul or prætor. This rite degenerated after Clodius's sacrilege in 62 B.C. See Cicero's *Epist. ad Atticum*, i. 12; Warde Fowlers's *Roman Festivals*; Tyrrell's *Correspondence of Cicero* (1879-1901); and Purser's ed. of Cicero's *Epist. ad Atticum* (1903).

Bona Fides (Lat. 'good faith,' as opposed to *mala fides*, 'bad faith'), a term used in civil law, chiefly in regard to sale and contract. If a person acquired possession of anything *bona fide* (i.e. without notice of any defect in title) and *ex justa causa* (i.e. by one of the usual means of acquiring property, such as purchase), and retained it for three years in the case of movables, and in the case of land for ten years if the parties were present, and twenty if they were not, he became by Roman law owner of the thing even against the real owner. The ownership of stolen goods, however, could not be acquired in this way. In England *bona fide* possession is no defence to an action by the true owner, except in the case of negotiable instruments or goods bought in market overt, or where the true owner is estopped by some act of his own from setting up his title, or in cases of prescription. To make a contract void on the ground of *mala fides*, it must amount to a fraud, unless the parties stand in a fiduciary relation to each other.

Bonai, the most southerly of the feudatory states of Chota Nagpur, Bengal, India; consists of a valley, surrounded by the Bonai Hills. Area, 1,349 sq. m.

Bonaire, isl., W. Indies. See CURAÇAO.

Bonald, LOUIS GABRIEL AMBROISE, VICOMTE DE (1753-1840), French philosopher and statesman, born at Mouna (Aveyron).

He retired with other royalist *émigrés* to Heidelberg in 1791, and there wrote *Théorie du Pouvoir Politique et Religieux dans la Société Civile* (3 vols. 1796). At the Restoration he became a member of the Council of Public Instruction, minister of state (1822), and was ennobled (1823). His principal works were *Législation Primitive* (1802); *Recherches Philosophiques* (1818), *Mélanges Littéraires* (1819). His *Œuvres* were collected in 3 vols. by Migne (1859). See Damiron, *Phil. en France au XIX^e Siècle* (3rd ed. 1834); and *Life* in French by Bonald's son VICTOR (1853). Another son, LOUIS JACQUES MAURICE (1787-1870), became bishop of Puy (1823), archbishop of Lyons (1839), and a cardinal (1841).

Bonanza (Lat. *bonus*, through the Spanish), a miner's term in the United States for the discovery of a rich vein of ore. The 'Big Bonanza,' one of ter. in the Comstock Lode, was struck in 1876. By analogy the term expresses any stroke of good luck.

Bonanza Creek, in the Yukon dist., Canada, joins the Klondyke R 2 m. from Dawson. It has rich placer-gold deposits.

Bonapartes, THE. The surname Bonaparte or Buonaparte was borne by various Italian families during the middle ages, and it occurs in Corsica in the 10th century. Their name was entered in the 'Golden Book' at Treviso as of noble rank.

BONAPARTE, CHARLES, or CARLO BUONAPARTE (1746-85), was a Corsican lawyer, and an adherent of the patriot Paoli. In 1767 he married Maria Letitia Ramolini, a strong-minded and accomplished patrician lady. On the failure (1768) of Paoli's rebellion, Charles Bonaparte accepted the French rule; and in 1773 he was appointed royal counsellor and assessor of the town and province of Ajaccio. In 1793 Napoleon's

mother went to Marseilles; but on Napoleon becoming first consul she removed to Paris. She was styled 'Madame Mère' after his coronation in 1804. She accompanied Napoleon to Elba, and after Waterloo she resided with her step-brother, Cardinal Fesch, at Rome, where she died in 1833. See *Madame Mère*, by Larry (1892). Among her children were:—

(1.) BONAPARTE, JOSEPH (1768-1844). Expelled from Corsica by the partisans of Paoli, he emigrated to Marseilles; and later, when his illustrious brother rose into power, he was appointed commissary-general, and in 1797 was sent as ambassador to the Pope. He negotiated the treaties of Lunéville (1801) and Amiens (1802). In 1806, much against his will, he accepted the throne of Naples; and in 1808 his brother made him king of Spain. He tried in vain to abdicate; but Wellington's triumph at Vitoria in 1813 at length put an end to his mock sovereignty. He was a mild and reasonable man, of a statesman-like mind, but a poor soldier. On the final fall of his brother he emigrated to the United States. He returned to Europe in 1832, and died in Florence. See Du Casse's *Mémoires du Roi Joseph* (1853-4).

(2.) BONAPARTE, NAPOLEON. See NAPOLEON I.

(3.) BONAPARTE, LUCIEN (1775-1840). In 1798 he was elected to the Council of the Five Hundred, where, as president, he rendered great service to Napoleon on the 18th Brumaire. He was subsequently minister of the interior, and in 1800 was sent as ambassador to Spain. Having married Madame Joubertson against the wishes of his brother, he went into retirement in Italy, where he was created Prince of Canino by the Pope. Napoleon's displeasure obliged him in 1810 to leave Rome, and he embarked

for the United States, but was captured by the British, who detained him until 1814. Becoming reconciled to his brother, he stood by him during the struggle of the Hundred Days; and it was by his advice that the emperor abdicated in favour of his son. When Louis XVIII. ascended the throne, Lucien Bonaparte retired with his family to Italy, where he died. See Jung's *Lucien Bonaparte et ses Mémoires* (1882-3).

Prince Lucien Bonaparte left five sons and two daughters. The eldest son, CHARLES LUCIEN JULES LAURENT BONAPARTE (1803-57), married his cousin Zénaïde, the daughter of Joseph Bonaparte, in 1822, and emigrated to the United States, where he became a distinguished naturalist. He produced his *American Ornithology*, a valuable work, in 1825-33; *Iconografia della Fauna Italica* in 1832-41; *Conspectus Generum Avium*, in 1850-65; besides other books. He succeeded to his father's title in 1840. Returning to Europe, he mingled for a time in politics on the republican side, but in 1849 settled quietly in Paris. One of his sons, Lucien, became (1868) a cardinal in the Church of Rome.—PAUL MARIE BONAPARTE (1808-27), second son, took part in the Greek war of liberation, fighting on Lord Cochrane's ship. LOUIS LUCIEN BONAPARTE (1813-91), the third son, became an eminent philologist, and an authority upon the Basque (*Langue Basque*, 1862) and Celtic languages. The Catalogue of his works (1858-88) includes no fewer than 222 books written either by himself or under his supervision. He ultimately settled in England, and was awarded a pension of £250 from the British civil list.—PIERRE NAPOLEON BONAPARTE (1815-81), the fourth son and the black sheep of the family, spent the early years of his erratic career in Italy, Belgium, and America. Re-

turning to France in 1848, his conduct caused great annoyance to his cousin, Napoleon III. In 1870 he shot dead Victor Noir, the journalist, with whom he was to fight a duel. Brought to trial, he was acquitted of murder, but was ordered to pay £1,000 to the Noir family. His remaining years were spent in England.

(4.) BONAPARTE, MARIE ANNE ELISA (1777-1820), married (1797) a captain in the French army, named Felice Bacciochi. She was a clever woman, and when, in 1805, Napoleon erected Lucca and Piombino into a principality, he conferred upon her the government. She became Grand-duchess of Tuscany in 1809. See Turquan's *Les Sœurs de Napoléon* (1896).

(5.) BONAPARTE, LOUIS (1778-1846), king of Holland, was in his brother's Italian and Egyptian campaigns. In 1802, in deference to the wishes of Napoleon, he married Hortense (1783-1837), daughter of General Beauharnais by his wife Josephine, afterwards empress of the French. The union was very unhappy, and the pair spent most of their married life apart. In 1806 Louis was made king of Holland; but declining to carry out Napoleon's tyrannical policy, he retired in 1810 in favour of his son, and Holland was annexed to France in the same year. He was the author of *Documents Historiques, etc., sur le Gouvernement de la Hollande* (1821); *Histoire du Parlement Anglais* (1820); *Réponse à Sir W. Scott* (1829); and a critique upon Norvins's *Histoire de Napoléon* (1834). After the final defeat of Napoleon, Hortense Bonaparte settled in Switzerland. She was the authoress of *La Reine Hortense en Italie, en France, et en Angleterre* (1833), and of a number of songs, including the popular *Partant pour la Syrie*. The third son of Louis and Hortense Bona-

parte was CHARLES LOUIS NAPOLEON. See NAPOLEON III.

(6.) BONAPARTE, MARIE PAULINE (1780-1825), also called CARLOTTA, was Napoleon's favourite sister, and, with her mother, shared his exile at Elba. She was married first (1797) to General Leclerc, afterwards (1803) to Prince Borghese. Canova immortalized her beauty as Venus Victrix.

(7.) BONAPARTE, CAROLINE MARIE ANNONCIATA (1782-1839), married Murat, king of Naples, in 1809, and shared in all his vicissitudes.

(8.) BONAPARTE, JEROME (1784-1860), king of Westphalia, the youngest brother of Napoleon I., was born at Ajaccio, and served as naval lieutenant in the Hayti expedition (1801). In 1806 he fought in the war against Prussia, and in 1807 was made king of Westphalia. He took part in the Russian expedition of 1812, commanded a division at Waterloo, and thereafter settled in Florence. On his return to France in 1848 he was appointed governor of the Invalides, and in 1850 was created a marshal of France. His third son by his second wife was NAPOLEON JOSEPH CHARLES PAUL BONAPARTE, known as PRINCE JEROME NAPOLEON (1822-91), and nicknamed 'Plon-Plon.' He was banished from France in 1845, on account of his republican tendencies. In 1848 he was elected to the National Assembly, and served with the army in the Crimean war. He married, in 1850, Princess Clotilde, daughter of Victor Emmanuel; and their eldest son, PRINCE VICTOR NAPOLEON (1862), is now the head of the Bonaparte family.

See NAPOLEON; Du Casse's *Mémoires et Correspondance du Roi Joseph* (1853-4); Bingham's *Marriages of the Bonapartes* (1881); *Mémoires Secrets de Lucien Bonaparte* (1819); *Mémoires de la Cour de Louis Napoléon*; Wouter's *Les*

Bonapartes depuis 1815 (1841); Du Cassé's *Mémoires du Roi Jérôme* (1861-6); and Martinet's *Jérôme Napoléon, Roi de West-falie* (1902).

Bonar, HORATIUS (1808-89), Scottish divine and hymn-writer; born and educated at Edinburgh; appointed minister of Kelso in 1837. He seceded with the Free Church at the Disruption in 1843, and became minister of Chalmers' Memorial Church, Edinburgh, in 1866. He was editor of various religious journals, and published numerous religious works, notably *Hymns of Faith and Hope* (1857-66; new ed. 1886), eighteen of which are in the *Scottish Hymnary*. See *Horatius Bonar, D.D.: a Memorial* (1889).

Bonasa, the genus to which belongs the ruffed grouse (*B. umbellus*) of N. America. It is peculiar in having the lower part of the legs as well as the toes devoid of feathers, and in possessing frilled ruffles of black feathers on each side of the neck. See GROUSE.

Bonaventura, co. of Quebec, Canada, bordering on the Baie de Chaleurs and New Brunswick. Pop. 25,000.

Bonaventura, or BUONAVENTURA, St. (1221-74), scholastic theologian and mystic, surnamed 'the Seraphic Doctor,' was born at Bagnorea in Tuscany. In 1238 he became a Franciscan friar. He received his doctor's degree at Paris after a great controversy, and in 1257 became minister-general of the Franciscans. He accepted the bishopric of Albano, and in 1273 was created a cardinal. He accompanied Gregory X. to the Council of Lyons, during the session of which he died (1274). Dante placed him among the saints in canto xii. of the *Paradiso*; and in 1482 he was canonized by Sixtus IV. His principal works are the *Breviloquium*, the *Itinerarium Mentis in Deum*, *De Re-*

ductione Artium ad Theologiam, and the *Biblia Pauperum*. His works were collected in 8 vols. folio (Rome, 1588-96) and 10 vols. quarto (1882-92). Works upon his life, character, and writings have been written by Hollenberg (1862), Vicenza (1874), Richard (1873), Borgognoni (1874), and De Chévacé (1899).

Bona Vista, bay, cape, dist., and tn., Northern Newfoundland. The numerous rocks and islands in the bay make its navigation both dangerous and intricate. The town, 75 m. N. by W. of St. John's, is a port of entry. Pop. 3,600. The cape is in 48° 40' N. lat.

Bonchamps, CHARLES MELCHIOR ARTHUR, MARQUIS DE (1760-93), Vendean general, born at Jouverteil in Anjou. He resigned his captaincy in the army at the Revolution, and was appointed a leader by the Vendéans. He frequently defeated the republican troops, but was mortally wounded before Cholet in 1793. His last act was to ensure the safety of 5,000 republican prisoners on whom the insurgents were about to wreak their vengeance. See *Life* by Chauveau and Dussieux (1817), and Blachet's *Bonchamp et l'Insurrection Vendéenne* (1902).

Bond, in English law, a document under seal by which one person promises to pay another a specified sum. It is often employed when it is sought to secure under penalty—in a money bond usually double the sum actually due—the performance of something, either the payment of money or the doing of some act; in such cases the promise is to become void on the happening of the particular event. At common law, on failure of the condition named in the bond, the full penal sum became payable; but the law now only permits the obligee to receive the amount of his actual loss.

Bond, a term used in bricklaying and masonry to indicate the arrangement of the bricks or the stones. See BRICKLAYING.

Bond, AFRIKANDER. See AFRIKANDER.

Bond, SIR EDWARD AUGUSTUS (1815-98), chief librarian of the British Museum, was born at Hanwell, near London, and entered the British Museum as a palaeographer in 1838, becoming keeper of the MSS. (1866) and chief librarian (1878). With Sir E. Maunde Thompson he founded the Palaeographical Society (1873). He was created C.B. (1885) and K.C.B. (1898). He edited *Speeches in the Trial of Warren Hastings* (4 vols. 1859-61), *Chronica Abbatie de Melsa* (Rolls Series, 1858), *Statutes of the University of Oxford* (1853), and a complete *Catalogue of the MS. Collections in the British Museum* (1870-5).

Bond, SIR ROBERT (1857), premier and colonial secretary of Newfoundland, was born in Newfoundland, and educated at Queen's College, Taunton, England. Having studied for the bar, he was elected to the Newfoundland Assembly (1880), appointed Speaker (1884), executive councillor and colonial secretary (1889-97), and premier (1900). He was a delegate to England relative to the French treaties question (1890), and was mainly instrumental in carrying through the Bond-Blaine convention (1890). He was also a delegate on the Newfoundland fisheries question (1892), and chairman of the Ottawa conference (1895). He was made a K.C.M.G. in 1901, and a P.C. in 1902.

Bond, WILLIAM CRANCH (1789-1859), American astronomer, born in Portland, Maine; became director of the observatory at Harvard University in 1840. He discovered the eighth satellite of Saturn (Sept. 19, 1848), invented the chronograph (1850), and was

one of the first (1848) to photograph celestial bodies.

Bonde (pl. *bönder*), originally, in the Scandinavian north, a peasant freeholder (odal owner). The term is now, however, synonymous with peasant as ordinarily understood.

Bonded Warehouse, a warehouse used for storing bonded goods—i.e., goods subject to inland revenue duty, but on which the duty has not been paid. Such goods are warehoused under government supervision. When removed for sale within the country the duty is paid; when removed for exportation no duty is paid. The system of bonding goods in a warehouse was authorized by an act passed in 1802.

Bondeno, *tn.*, prov. Ferrara, Italy, 11 m. by rail N.W. of Ferrara, on the Panaro. Rice and hemp are grown in the neighbourhood. Pop. comm. 16,000.

Bondi, CLEMENTE (1742-1821), Italian poet and Jesuit, born at Mezzano in Parma. After the suppression of his order he devoted himself to literature, and became (1797) librarian to the Archduke Ferdinand at Brünn, and in 1815 professor of history and literature at Vienna, where he died. His poems, including his most famous work, *Giornata Villericca*, as well as French translations of Virgil and Ovid, were published in 3 vols. (1808).

Bonds. See AMERICAN RAILS.

Bondu, a native Fulbe kingdom of W. Africa, in the French colony of Senegal, between the middle Gambia and the Faleme; is well watered and fertile, and produces iron and gold, cotton, indigo, tobacco, and the usual W. African products. Pop. 500,000. It became French in 1858.

Bonduku, *tn.*, West Africa, in the French colony of the Ivory Coast, close to the w. boundary of Ashanti, and in about 8° N. lat.

Bondy, comm., Seine dep., France, 6 m. S.E. of St. Denis; has chemical industries and breweries. Pop. 5,900.

Bône, Algeria. See **RONA**.

Bone is one of the hardest structures of the animal body, and possesses also a certain degree of toughness and elasticity. It serves as the framework or skeleton of the body, supporting the softer structures, forming the joints, and protecting the viscera. It is composed of earthy and animal matter in the proportion of 67 per cent. of the former and 33 per cent. of the latter. Of the earthy matter 56 per cent. is calcium phosphate, the rest being calcium carbonate, calcium fluoride, and magnesium phosphate. Rickets, mollities ossium, and caries are associated with deficiency of the earthy matters. The organic substance is chiefly collagen—a substance which is converted into gelatin by boiling. A section of bone is seen to be composed of two kinds of tissue—one external, hard like ivory, a compact and dense tissue; the other internal, a spongy or cancellous tissue resembling a lattice-work. The shaft of a long bone consists of compact bone surrounding a central canal or 'medullary cavity,' so called from its containing the medulla or marrow. Bones are enclosed in a fibrous membrane, the 'periosteum,' by means of which many of the blood-vessels reach the hard tissue. When the periosteum is stripped from the surface of a living bone, the small bleeding points which are seen mark the entrance of the periosteal vessels; the long bones are supplied also by a nutrient artery which enters at the 'nutrient foramen' in the shaft, reaches the medullary cavity, and breaks up into branches, from which small vessels are distributed to the interior of the bone for the supply of the marrow. Veins

emerge from the long bones in various places. Examined with a lens of low power, a section of bone is seen to be divided into a number of circular areas, each of which consists of a central hole surrounded by a number of concentric rings. These areas are called Haversian systems. The central hole is a Haversian canal. The average diameter of the Haversian canals is one five-hundredth of an inch; they contain blood-vessels, and the minute canaliculi and lacunæ convey the lymph which is exuded from the blood-vessels to the substance of the bone which they traverse. The lacunæ are occupied by branched cells, called bone cells or bone corpuscles, each of which is a little mass of protoplasm, and serves for the nutrition of the bone immediately surrounding it. One lacunar corpuscle communicates with another, with its surrounding area, and with the blood-vessels of the canals, by means of the minute streams of nutrient lymph which occupy the canaliculi.

Bone grows in girth by the deposition of layers under the periosteum, like successive rings under the bark of a growing tree. Duhamel placed silver rings round the bones of young pigeons, and when these were killed the rings were found completely covered in by bone; in the animals killed last they were found in the central cavity. John Hunter fed pigs alternately on ordinary food and on food dyed by the red pigment madder. The rings of bone deposited during the madder period were red, and easily distinguished from the others.

Diseases of bone may be classified as follows: *Bacterial diseases*—pyogenic, tuberculous, syphilitic. *Parasitic diseases*—actinomycosis, mycetoma, hydatid cysts. *Trophic diseases*—rickets, scurvy-

rickets, osteomalacia, osteitis deformans, leontiasis ossea, fragilitas ossium. *Tumours and cysts.*

Pyogenic disease of bone results from infection with pus-forming organisms, and occurs chiefly before the growth of the skeleton is completed. The *staphylococcus aureus* is the cause of various forms of osteomyelitis and periostitis, of chronic abscess of bone, and of necrosis, with or without suppuration. Other organisms causing bone disease are *pneumococcus* and the typhoid bacillus. Pyogenic diseases of bone also arise from direct infection through a wound or other breach of surface, as in amputations, in compound fractures, and in diseases of adjacent soft parts. Tuberculous disease of bone occurs very frequently as the result of the infection of the marrow and periosteum by tubercle bacilli, which have been conveyed to those tissues through the arteries. Syphilitic disease of bone is caused through infection by the syphilitic virus as a consequence of the general disease.

Bones are frequently the seat of tumours, both primary and secondary. Examples of primary tumours are osteoma, chondroma, sarcoma, and fibroma; and of secondary tumours, carcinoma. For the morphology of bones, see SKELETON.

Bone, HENRY (1755-1834), English painter, was born at Truro. He went to London in 1778, and was employed in enamelling watches and fans, and in enamel painting. His chief works are a series of historical portraits of the time of Elizabeth, *Barchus and Ariadne*, and the *Cavaliers Distinguished in the Civil War*. He was appointed enamel painter to the king in 1801, and a R.A. in 1811. See Sandby's *Hist. of the Royal Academy* (1862).

Bone, MUIRHEAD, Scottish etcher, born in Glasgow (1876),

member of New English Art Club and the Society of Twelve. His works are as highly prized as those of any living etcher. He is especially successful with city scenes and weather impressions.

Bone Ash, or BONE EARTH, the residue obtained by calcining bones in the presence of air until they are white, consists chiefly of calcium phosphate, together with some carbonate. It is used in the manufacture of cupels for assaying, in the preparation of phosphoric acid and phosphorus, and is the basis of several artificial fertilizers.

Bone-beds, beds of rock containing fossil bones of animals in great abundance - e.g. the Ludlow bone-bed, near the top of the Silurian system in Shropshire and Herefordshire, where the bones, scales, teeth, and plates are principally those of fishes. Another occurs at Aust, in Gloucestershire, and is in places from two to three feet thick. Many beds of the Jurassic are so full of bones of reptiles, with coprolites and other phosphatic materials, as to be used for the manufacture of manures. Many bone-beds exist in western N. America, and yield remarkable fossils belonging to extinct races; the 'big bone lick' of Kentucky is another celebrated example. In caves a red earth is often found containing many bones of animals which lived there, or had been dragged thither by beasts of prey; this is generally known as bone earth. See PHOSPHATES; COPROLITES; Hutchinson's *Extinct Monsters* (1892), and *Creatures of Other Days* (1894); Boyd Dawkins's *Cave Hunting* (1874).

Bone-black, or ANIMAL CHARCOAL, is obtained by heating bones, from which the fat has been removed by a solvent or by boiling, in retorts from which air is excluded. The bone-black contains phosphate and carbonate of

lime, with about 10 per cent. of carbon, in a state of very fine division. Its principal use is in sugar-refining, a solution of raw sugar filtered through it being completely decolourized.

Bone Manure. It is chiefly for the phosphates which they contain that bones are valuable as manure; but they contain also about 4 per cent. of nitrogen, when employed in the raw state. According to the degree of fineness to which the bones are ground or crushed, they are spoken of as half-inch bones, quarter-inch bones, and bone meal. The more finely divided forms are quicker in action and less lasting in effects. The half-inch bone is said to require about seven years for complete disintegration in the soil. Raw bone contains from 43 to 49 per cent. of phosphate of lime. Bone is usually applied to pastures at the rate of about half a ton per acre. By a process of fermentation, effected by mixing them with clay and urine, bones are rendered more immediately valuable as manure, through the partial conversion of insoluble into soluble phosphate. Boiled and steamed bones are those from which the gelatin, and consequently much of the nitrogen, has been extracted by heat. They are much more quickly decomposed in the soil than is the case with raw bones. So-called dissolved bones, or bone superphosphate, is the form of bone manure in which the phosphate has been converted into soluble superphosphate by treatment with sulphuric acid. To make bone superphosphate, place a ton of ground bones in a wooden tank, add about fifty gallons of water, and then add about an equal volume of oil of vitriol mixed with its own bulk of water. In a few days add enough ashes or peat to absorb any excess of fluid. This may be applied at the rate

of about a quarter of a ton per acre. Bone ash (the residue left from burnt bones) is largely used as a phosphatic manure, and contains about 75 per cent. of phosphate. It is chiefly imported from S. America, and is employed in the preparation of bone ash superphosphate. The phosphates are essential to nearly every plant's growth, but their effects are most noticeable in the case of turnips and allied species.

Bone Oil, ANIMAL OIL, DIPPEL'S OIL, or OIL OF HARTSHORN, distilled from the retorts in the preparation of bone-black, is a dark brown, evil-smelling liquid containing ammonia, sulphuretted hydrogen, and a number of organic bases, particularly the closed-chain compounds, pyrrol, pyridine, and their derivatives.

Boner, CHARLES (1815-70), English poet and traveller, born at Bath; lived on the Continent from 1840, and was, after 1865, correspondent at Vienna and other places of the *Daily News*; died at Munich. He published *Chamois Hunting in the Mountains of Bavaria and in the Tyrol* (1853; new ed. 1860); *Verses* (1858); *Forest Creatures* (1861)—i.e. the game of Germany; *Transylvania: its Products and its People* (1865). He also translated several of Hans Andersen's fairy tales—*A Danish Story-book* (1845), *Nightingale* (1846), *The Shoes of Fortune* (1883). See *Memoir and Letters of Charles Boner* (2 vols. 1871), and *Memoirs* (2 vols. 1875).

Boner, ULRICH, writer of fables, a native of Bern, flourished in the second quarter of the 14th century. He compiled the oldest book of fables in German, his *Edelstein*, to serve as a 'talisman' against the evils and errors of the world. There are a hundred fables, taken from the Latin col-

lections of Avianus and the *Anonymus Neveleti*; they are told in simple language, not without grace, and each has its moral, often far-fetched, and in some cases even incongruous. There is a critical edition by Pfeiffer (1844), and some modernized selections have been prepared by Oberbreyer (1880) and Pannier (1895).

Bo'ness. See BORROWSTOUNNESS.

Bonfire ('bone-fire,' 'fire of bones'), probably originating in the funeral pyre. Bonfires were lighted in early times to avert plagues or evil spirits, and became connected with ceremonial observances (*cf.* the lighting of fires on Midsummer Eve). The burning of effigies in such fires may be a relic of propitiatory sacrifices. Firmly rooted in the pagan mind, they were adopted and consecrated by the church: thus, in the Catholic Church the new fire is blessed at Easter, and in the Orthodox Greek Church lighted tapers are carried at that festival. Modern bonfires are lighted on occasions of public rejoicing, as at the jubilee, the King's accession, etc. The signalling by bonfires at the time of the Spanish Armada, and the bonfires still lighted on Guy Fawkes Day (November 5), deserve mention. See BEACON; BELTANE.

Bonga, *ta.*, Abyssinia, *cap.* of Kaffa, 400 m. w.s.w. of Harar; trades chiefly with the Galla countries.

Bongar, a name sometimes applied to certain poisonous snakes of the genus *Bungarus*, one of which is the deadly *crait* or *krait* of India. The snakes of this genus are closely allied to the cobra. The krait (*B. candidus*) is dark brown or bluish black above, with bands or spots of white or yellow, and uniform white below. The length does not exceed 4 ft. It is very com-

mon in Bengal and S. India, and is said to cause more deaths than any other Indian snake.

Bongardia, a genus of the harrberry family. One species only is known, *B. Rauwolfii*, a small, stemless plant, found in Greece, Syria, Persia, and Afghanistan, with a tuberous underground root-stock. The Persians roast or boil the tubers for food; the leaves are eaten like sorrel.

Bon Gaultier Ballads, parodies of modern poetry written by Professor W. E. Aytoun and Sir Theodore Martin (1840-4). They were reprinted from *Blackwood's Magazine*, and went through thirteen editions between 1855 and 1857. The pseudonym 'Bon Gaultier' was that adopted by Martin when he wrote in *Fraser's Magazine* and *Tait's Edinburgh Magazine*.

Bonghi, RUGGERO (1826-95), Italian scholar, political writer, and statesman, was born at Naples, and took an active part in the political events of 1847-9. Between the years 1859-77 he held various chairs of philosophy, classics, and ancient history at Pavia, Turin, Florence, Milan, and Rome. In 1860 he entered Parliament, and was minister of education from 1874-6. Thereafter he devoted himself to literature. His numerous works include *Storia di Roma* (1884-6), *Storia dell'Europa durante la Rivoluzione Francese* (1890-4), various biographies (*Vita di Gesù*, 1890; *Arnaldo da Brescia*, 1884), translations of Plato, Aristotle, etc., and essays on contemporary politics. He was a regular contributor to the *Nuova Antologia*.

Bongo, a negro race in the Sudan, between the head-waters of the Bahr el Ghazal and the Ubangi. They are of middle stature, strongly made, and have a reddish-brown skin. They exhibit some skill in the working of iron.



The Horse Fair (central portion). By Rosa Bonheur.

Bonham, co. seat of Fannin co., Texas, U.S.A., 75 m. N.N.E. of Dallas. Has cotton-seed oil and flour mills and machine shops. Pop. 5,000.

Bonheur, ROSALIE or ROSA (1822-99), French painter of animals, was born at Bordeaux, but early moved (1830) to Paris. Her habit was to study animals not only in their anatomy, but also in their passions. With this object she frequented markets and slaughter-houses. She was eighteen when her first picture was exhibited at the Salon, and in 1848 she painted her famous *Atelage Nivernais*, now in the Luxembourg. After the exhibition of 1855 she rarely exhibited. The *Horse Fair* was painted in 1853; the original is in the New York Museum, and a replica in the London National Gallery. In 1855 the cross of the Legion of Honour was conferred on her by the Emperor Napoleon III. She painted in Spain and Scotland, but her usual residence was near Fontainebleau. Many of her pictures are in England, four being in the Wallace Collection. See her *Reminiscences*, ed. by Theodore Stanton (1910), and Roger-Miles's *Rosa Bonheur* (1900).

Bonhill, par. and tn., Dumbar-tonshire, Scotland, on the Leven, adjoining Alexandria. Has calico printing and bleaching. Smollett was a native. Pop., par. 15,000; tn. 3,500.

Boni. (1.) GULF OF, in the Dutch E. Indies, separates the two southern peninsulas of Celebes. (2.) Native state, situated on E. side of the S.W. peninsula of Celebes (W. of Gulf of Boni); yields cassia, rice, and sago. The people are Buginese, and are skilful workers in gold and iron. The capital is Boni, on the coast. Pop. of state, 200,000.

Boniface, the name of nine popes. BONIFACE I., bishop of Rome (418-422), was a contem-

porary of St. Augustine, who dedicated to him his *Quatuor Libri contra Duas Epistolas Pelagianorum*.—BONIFACE III. was consecrated Pope in February 607, and died in October of the same year. He obtained from the Emperor Phocas recognition of the headship of the church at Rome.—BONIFACE V. (619-625) enacted a decree by which churches became places of refuge for criminals. He did much for the Christianizing of England, and four of his letters relative thereto are reproduced in Bede's *Eccles. Hist.*—BONIFACE VIII., BENEDICT CAJETAN (1294-1303), born at Anagni, was a man of great ability. He strongly upheld the temporal as well as the spiritual power of Rome, and was involved in disputes with the Colonnas and Philip the Fair of France, whom he excommunicated. He was proceeding to interdict the whole of France when he was made prisoner at Anagni, and although released almost immediately by the populace, the shock proved fatal.—BONIFACE IX., PIETRO TOMACELLI (1389-1404), quarrelled with Richard II. of England regarding the collation of benefices. During his reign Clement VII. asserted his right to the Papedom, and held his court at Avignon.

Boniface, ST. (680-755), the monastic name of Winfried, archbishop, and the great 'Apostle of Germany,' a native of Crediton, Devonshire. Trained in Benedictine monasteries at Exeter and later at Nursling, he was ordained priest. In 718 he went to Rome, where he was commissioned by Gregory II. to the heathen nations of Germany, and laboured as missionary for thirty years. He was consecrated to the bishopric in 723, and founded four cathedrals—Erfurt, Baraburg (near Fritzlar), Eichstätt, and Würzburg—and established episcopal sees at Freising, Passau,

and Regensburg. Gregory III. appointed Boniface archbishop and primate of all Germany; he was chosen archbishop of Mainz in 746, but resigned the see in 754, in order to devote himself more fully to the evangelization of the heathen. During an open-air confirmation service in Friesland in 755, Boniface and his converts were massacred by the populace. His remains were finally buried at Fulda, where he had founded the celebrated monastery. There is a *Life of Boniface* by Willibald (in *Monumenta Germaniae Scriptorum*, vol. ii. 1829), and his *Letters* have been edited by Giles (1844) and Jaffé (1866). See also Mabilloff's *Life* of him (1708); Dunham's *Hist. of the Germanic Empire*, vol. ii. (1835); and C. Merivale's *Conversion of the West* (1878).

Bonifacio. (1.) STRAIT OF, narrow, rocky passage, difficult of navigation, 7 m. wide, between Corsica and Sardinia. (2.) Town, s. coast, Corsica, 16 m. s.s.w. of Porto Vecchio. It has a coasting trade and coral fisheries. Pop. 3,800.

Bonington, RICHARD PARKES (1801-28), an English artist whose youth was spent in Paris, was a romantic painter in the days of classical influences, a friend of Delacroix, and deeply influenced by his great contemporary Constable. His landscapes (especially in water colour) and his historical paintings are famous for their brilliancy of colouring. Bonington also drew sketches for lithography, and sometimes drew on the stone. The National Gallery, London, has one painting; the South Kensington Museum, two landscapes in oil and seven drawings; the Wallace Collection has thirty-four oils and water colours—a very representative series of his historical and landscape work. See Muther's *History of Modern Painting* (1895-6), and Cheneau's *Eng. School of Painting* (1884).

Bonin Islands, Japanese volcanic group, Magellan Archipelago, N. Pacific, about 24° N. and 142° E., divided into four clusters—viz. Coffin Is., Beechey Is. (principal, Peel I., with Port Lloyd, which has a good anchorage), Kater I. and adjacent rocks; and Parry Is. The European and Polynesian half-breeds, and the Japanese colonists who inhabit the group, catch turtle and sharks (for their fins and oil). The Japanese used these islands as a penal settlement from 1593 to 1725, and in 1876 took definite possession of them.

Bonito (*Thunnus pelamys*), a fish allied to the Mediterranean tunny, found abundantly in temperate and tropical seas. Like its ally the mackerel, it is an active, predaceous animal, its chief food being flying-fish.

Bonivard, FRANÇOIS DE (1493-1570), the original of Lord Byron's *Prisoner of Chillon*, was born at Seyssel of an ancient Savoyard family, and in 1510 succeeded his uncle as prior of the Cluniac monastery at Geneva. Owing to his hostility to the Duke of Savoy, he was seized in 1530, and spent six years in the castle of Chillon, during four of which he was underground. Released by the Bernese in 1536, when they wrested Vaud from Savoy, he returned to Geneva, and became a Protestant. In 1542 the city commissioned him to compile its history, a task which he completed in 1550. But Calvin found both style and matter wanting, so that the *Chroniques de Genève* were never printed till 1831 (best ed. 1867, by Revilliod). The work is uncritical, diffuse, and partial.

Bonjem, small oasis, hinterland of Tripoli, N. Africa, on direct track between that town and Sokna, 210 m. s.e. of Tripoli. Contains Roman buildings in excellent repair. Visited by Edward Dobson (1901).

Bonn, tn., prov. Rhineland, Prussia; has a charming situation on the l. bk. of the Rhine, 21 m. s.s.e. of Cologne by rail. It is the seat of a university, with 3,600 students. The most conspicuous building is the minster, an example of late Romanesque architecture, completely restored since 1875. Other noteworthy structures and institutions are the university (1818); the provincial (Rhenish) museum, built 1889-93; the museum of the Academy of Arts; the municipal museum; the castle of Poppelsdorf, which contains the natural history collections of the university; Beethoven's house, since 1889 a museum; the house of Arndt; and the bridge across the Rhine, 1,417 ft. long, built in 1896-8. Behind the town rises the hill Kreuzberg (410 ft.), crowned by a famous pilgrimage church. Bonn has an agricultural high school and a botanic garden. It is an episcopal see of the Old Catholics. Bonn is the *Castra Bonnensia* of Tacitus, one of the chief Roman camps on the Rhine. It was almost destroyed by the Elector Frederick III. of Brandenburg in 1689, and was besieged by Marlborough in the war of the Spanish Succession. Its fortifications were demolished in 1717. Pop. 85,000.

Bonnat, LÉON JOSEPH FLORENTIN (b. 1833), a celebrated French painter. He began to exhibit in the Salon in 1857, and his genius declared itself in the *Pilgrims at the Foot of the Statue of St. Peter* (1864). His *Assumption* (1869) is at Bayonne, his *St. Vincent de Paul taking the Place of a Galley Slave* (1866) in St. Nicholas des Champs, his *Christ on the Cross* (1874) in the Palais de Justice, Paris, and his *Martyrdom of St. Denis* in the Pantheon. But his fame rests chiefly on his portraits, remarkable for energy and keen insight. Among his subjects

have been Victor Hugo, Thiers (Louvre), Puvis de Chavannes, Pasteur, Dumas, Renan, Ferry, Grévy, and Cardinal Lavigerio (Luxembourg). See Van Dyke's *Modern French Masters* (1896); Brownell's *French Art* (1902).

Bonner, EDMUND (?1500-69), bishop of London, who, through the patronage of Cardinal Wolsey, came to be of great service to Henry VIII. in his controversy with the Pope (1532-4). In 1539 he was elected bishop of London. Under Henry he maintained the principle of royal supremacy; but under Edward VI. he resisted the claim of the Privy Council to uncontrolled authority in church and state, and was confined in the Marshalsea prison from 1549 to 1553. On the accession of Queen Mary he was restored to his bishopric. Refusing to take the oath of supremacy (1559) to Elizabeth, he was again sent to the Marshalsea, where he died. See Burnet's *Reformation* (1679-1715).

Bonnet. (1.) A headdress for men and boys, usually soft, and distinguished from the *hat* by the absence of brim. The bonnet has been retained in Scotland in three forms—the 'braid' or Lowland bonnet, made of milled woollen, without seam or lining; the glengarry, or Highland bonnet, which rises to a point in front (till recently the undress cap of the army and volunteers); and the Balmoral, flat, and resembling the Lowland bonnet. Local magnates of Scotland who wore the 'braid bonnet' were dubbed 'bonnet lairds.' (2.) A headdress of women worn out of doors, distinguished from a hat mainly by the want of a brim, and by its covering no part of the forehead. The earliest head gear of the women of Britain was a felt or woollen cap called *huet*, worn by the higher class of Anglo-Saxons. This was superseded by a hood or

veil, which lasted till the reign of Edward III., when hats first became general; but with the accession of Richard II. they were discarded in favour of coloured hoods. Velvet headdresses were usual in the reign of Henry VIII.; French caps were fashionable in the reign of Elizabeth, who introduced the ermine bonnet, which was 'forbidden to all but gentlewomen born.' Since that time changes in the style of hats and bonnets have been innumerable. See article 'Headdress' in Fairholt's *Costume in England* (1885).

Bonnet, CHARLES DE (1720-93), naturalist, was son of a French family settled at Geneva. His first work was the *Traité d'Insectologie* (1745), which was permeated by the philosophical idea, then so powerful at Geneva, of the interdependence of all parts of the universe, physical and moral. In 1754 appeared his *Recherches sur l'Usage des Feuilles dans les Plantes*, a treatise on vegetable physiology, followed later by *Considérations sur les Corps Organisés* (1762). In his *Essai de Psychologie* (1755) he sought to show the links between the moral and the physical world. His teaching is most perfectly summed up in his *Contemplation de la Nature* (1764)—of which it has been said that it might have been called the *Esprit de la Nature*—and in his *Palingénésie Philosophique* (1769-70), dealing with the immortality of all men and animals. He was strongly opposed to Voltaire and Rousseau. See *Mémoire* by Trembley (1794), and *sa Vie et ses Œuvres* by the Duc de Caraman (1859).

Bonneval, CLAUDE ALEXANDRE, COMTE DE (1675-1747). French soldier, descended from a noble family in Limousin. Having received a commission (1706) in the Austrian army, he fought against France (1706-12), and under Prince Eugene against

Turkey (1716-17). Exiled for insulting the Marquis de Prié (1724), he became an officer (Ahmed Pasha) in the Ottoman army. Once more he made enemies, who procured his banishment to Chio (1738); but he was recalled, and died at Constantinople. His supposed autobiography (Lond. 1806) is not genuine. See Prince de Ligny's *Mémoire sur le Comte de Bonneval* (1817), and Vandal's *Le Pacha Bonneval* (1885).

Bonneville Lake, a former great inland sea of the United States of America, covering portions of Nevada, Utah, Oregon, and California, of which the Great Salt Lake is a remnant. It was over 350 m. in length and 1,000 ft. deep.

Bonney, THOMAS GEORGE (1833), English geologist, born at Rugeley; emeritus professor of geology in University College, London; was educated at St. John's College, Cambridge. He was president of the Geological Society (1884-6); Hulsean (1884), Boyle (1890-2), Rede (1892) lecturer, and president of the British Association (1910). He is an honorary canon of Manchester. Among his works are *The Alpine Regions* (1868), *The Story of our Planet* (1893), *Charles Lyell and Modern Geology* (1895), *Ice Work* (1896), *Volcanoes* (1898), and 4 vols. of *Sermons*.

Bonny. (1.) Town, W. Africa, on the s. coast of the colony of S. Nigeria, 80 m. E. of the mouth of the Niger. It exports palm oil. Pop. about 7,000. (2.) River, one of the E. mouths of the Niger, falling into the Bight of Biafra; formerly a notorious haunt of slave traders.

Bonomi, JOSEPH (1739-1808). British architect, was born of Italian parents in Rome. In 1789 he was elected A.R.A. His designs were chiefly in the style of Grecian architecture. His

most celebrated buildings are the Italian villa at Roseneath in Dumbartonshire, Langford Hall in Shropshire, and Dale Park in Sussex.

Bonomi, JOSEPH, the younger (1796-1878), draughtsman and sculptor, was the son of the above. His hieroglyphic drawings are second only to those of Wilkinson. He illustrated the important Egyptological works of Wilkinson, Birch, Hay, and Sharpe. He also published a book on Nineveh, and wrote valuable papers on obelisks and other Egyptian monuments.

Bonorio. (1.) Now Bologna, Italy. (2.) Now Boulogne, in the N.W. of France; anciently the chief port of departure for Britain. (3.) The Latin name for Widdin, a town of Bulgaria.

Bonorva, tn., Sardinia, 25 m. S.S.E. of Sassari; with medicinal springs. Pop. 6,000.

Bonpland, AIMÉ (1773-1858), French naturalist, born at La Rochelle; travelled with Alexander von Humboldt in America (1799-1804), and was director of the gardens of Josephine at Malmaison (1805-14). Appointed professor of natural history at Buenos Ayres in 1818, he was seized by Francia, dictator of Paraguay, while engaged on scientific work on the Paraná, and kept a prisoner (1821). After his release (1829) he devoted himself to agriculture, first in Brazil, and later in Argentina. His works include *Plantes Equinoxiales* (1805-18, with 140 plates) and *Monographie des Mélastomacées* (2 vols. 1806-23, with 120 plates). See Brunel's *A. Bonpland* (3rd ed. 1872).

Bonsignori, or BUONSIGNORI, FRANCESCO (1455-1519), Italian painter of the Veronese school; called the 'modern Zeuxis,' from the lifelikeness of his work. Many of his pictures from the Mantuan collection belonged,

after the catastrophe of Mantua in 1630, to Charles I. Other important works are Madonnas with saints in the Pinacotheca at Verona (1488), and in S. Fermo at Verona; a portrait of a man in Pitti Gallery, Florence (attributed to Giacomo Francia); portrait of Elizabeth, wife of Gonzaga, Duke of Mantua, in Uffizi Gallery, Florence (ascribed to Mantegna); the Venetian Senator in the National Gallery, London, etc. See Vasari's *Lives of Italian Painters* (1895).

Bonstetten, ALBERT VON (c. 1441-1504), a monk of the great Benedictine monastery of Einsiedeln in Switzerland (elected dean in 1470), who in 1479 wrote (in Latin and German) the first *Description of Switzerland* (first ed. 1836; best ed. that of Büchi, 1893, together with his letters and other writings). He also wrote a treatise on the *Banishment of Justice and other Virtues* (1470), an account of Charles the Bold's wars (1477), various works relating to Einsiedeln and its patron saint Meinrad, and a history of the house of Austria (1491). See *Life* by Büchi (1889).

Bonstetten, KARL VICTOR VON (1745-1832), Swiss littérateur, a scion of one of the great patrician families of Bern, was profoundly influenced by Rousseau. Later he visited England, and was a friend of the poet Gray. In 1768 he entered political life at Bern. Named in 1779 governor of Saanen (Gessenay), he wrote *Lettres Pastorales sur une Contrée de la Suisse*, describing this charming region. In 1787 he was transferred to Nyon, but showed himself too liberal on the outbreak of the French revolution, and retired in 1792. From 1795 to 1797 he ruled (for the Confederation) the Italian bailiwicks of Lugano, Locarno, and Val Maggia, of which he wrote a pleasing description (1797). Re-

tiring once more into private life, he spent three years (1799-1801) in Scandinavia with his friend Frederica Brun, with whom he later (1802-3) made a long journey in Italy. In 1803 he settled at Geneva, where he associated with Madame de Staël and the historians of Switzerland, Johannes von Müller and Zschokke. His most famous work is *L'Homme du Midi et l'Homme du Nord* (1824), one of the earliest treatises on the influence of climate on the characters of various peoples—the south, in his view, being far inferior to the north. He also wrote his *Souvenirs* (1831). See *Lives* by Steinlen (1860, in French), Morel (1861, in German), and R. Willy (1900).

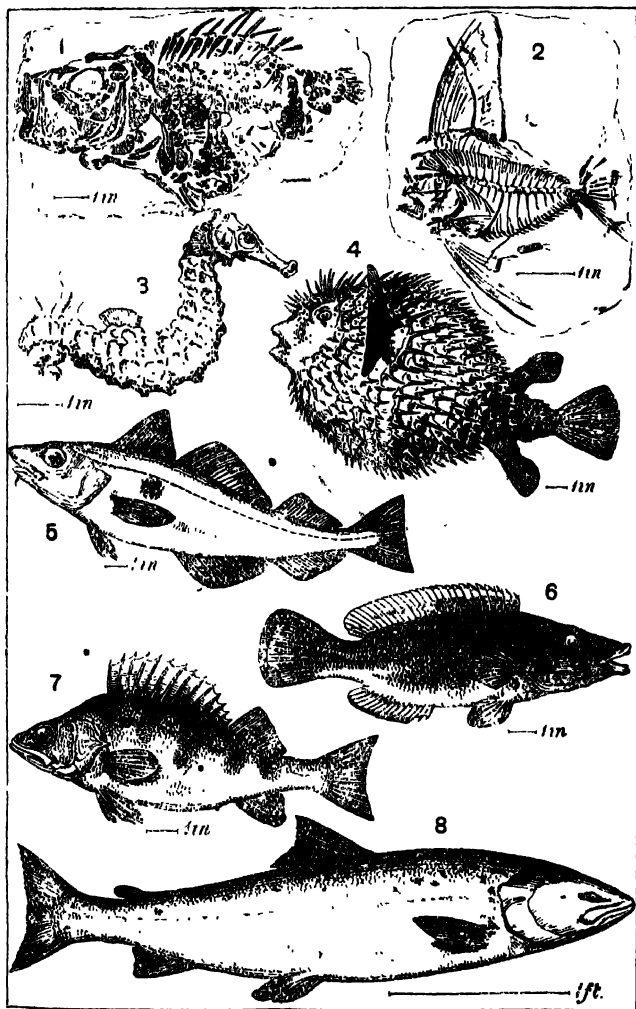
Bonus, sum paid to proprietors of shares as supplementary to the regular dividend. Bonuses usually arise out of the undivided profits of former years, or are occasioned by exceptional transactions; in such cases the directors are unwilling to create a precedent by raising the nominal dividend. For the question whether a bonus belongs to the liferenter of the shares or to the person ultimately entitled to them, see *Bouch v. Sproule* (12; Appeal Cases, 385). The bonus given by an insurance company is an addition made to the amount insured for under a life policy. The amount is determined by the profits of the company as ascertained by periodical valuation.

Bonvalot, PIERRE GABRIEL (1853), French traveller, born at Epagne, Aube. He explored Central Asia in 1882, Persia and the Pamirs (1885-7), Siberia to Tongking with Prince Henri of Orleans (1889-90), Ethiopia in 1897, and Central Asia again in 1900-1. His chief works are *En Asie Centrale: I. De Moscou en Bactriane* (1884), and *II. Du Kohistan à la Caspienne* (1885); *De*

Paris au Tonkin (1892); *L'Asie inconnue* (1896).

Bonvin, FRANÇOIS SAINT (1817-87), French painter and etcher. His earliest successes were achieved with portraits. He treated lamplight effects with great success, notably in *A Woman Eating* (1848), *The Etcher* (1873), and in the water-colour drawing *The Woman Watching* (1877). His subjects are interiors, still life, and figures, studied with great refinement and realism. Most of his work belongs to private owners, but the museums of Rodez, Niort, and Arras have fine examples; also in the Luxembourg at Paris, *The Servant at the Fountain* and *The Refectory*. See Brownell's *French Art* (1902).

Bony Fishes, or TELEOSTEANS, an important order of fishes, including the vast majority of living forms. Since their first appearance, apparently in Jurassic times, they have increased in numbers, until at the close of the Secondary epoch they acquired the numerical superiority which they have never since lost. Ganoids and teleosteans are very closely related, and it is believed that the bony pike is the nearest living representative of the stock from which the latter arose. As special teleostean characters, are to be noted the soft scales, the completely bony skeleton, the usually homocercal or even-lobed tail, the swim-bladder, the absence of a spiral valve in the intestine, the existence of an anus instead of a common opening for food-canal and urino-genital organs, together with some less obvious anatomical peculiarities. The classification is a matter of difficulty; the following is based on that of Günther:—Sub-order A. *Physoclysti* (duct of swim-bladder closed): (1) Lophobranchii, with tufted gills—*c.g.* sea-horse, pipe-fish; (2) Plectognathi, bones of upper jaw



Bony Fishes.

1. *Hoplopteryx Leweniensis* (fossil). 2. *Semlophorus vellifer* (fossil). 3. Sea-horse. 4. Globe fish. 5. Haddock. 6. Cook wrasse. 7. Perch. 8. Salmon.

fused—globe-fish, sun-fish; (3) *Anacanthini*, fin-rays soft—cod, haddock, sole; (4) *Pharyngognathi*, some of the fin-rays spiny, lower pharyngeal bones fused—wrasse; (5) *Acanthopteri*, some of the fin-rays spiny, lower pharyngeal bones free—perch, stickleback. (4) and (5) are sometimes included in one group as *Acanthopterygii*. Sub-order *B. Physostomi*, swim-bladder with open duct, fin-rays soft—salmon, herring, eel.

Bonyhad, *tn.*, Tolna co., Hungary, 18 m. N.E. of Fünfkirchen. Pop. 6,000.

Bony Pike. See GAR-PIKE.

Bonze, a member of a Buddhist fraternity; but the name is generally applied to any Asiatic monk or priest. It comes from a Japanese pronunciation of *fan sung*, which means an ordinary member of the assembly (monastery, etc.).

Booby, a name applied to those species of the bird genus *Sula* in which the whole of the lower jaw and throat is bare of feathers. They differ from the closely-allied gannet in this character, and also in breeding in trees instead of upon rocks, and in being confined to warm climates. They owe their common name to their seeming stupidity in allowing themselves to be caught by hand. Common forms are *S. cyanops*, from the S. Pacific, which closely resembles a gannet in appearance; and the dark brown *S. leucogaster*, found in the tropical parts of the great oceans.

Booby Island, small, rocky island, dangerous to the navigation of Torres Strait, Queensland.

Book (O.E. *boec*), originally a writing-tablet; then any written document, more especially a charter or legal deed; finally (as regards external form) a treatise written or printed on a number of leaves fastened together at the back and in some kind of binding

(without which thin books are called pamphlets); and, by transference, the literary matter thus preserved. Literary manuscripts, which are sometimes contrasted with books, are properly only a subdivision of them, so long as they are written on sheets of paper or vellum, or any substitutes for them, fastened and bound as already described. Previous to the introduction of this book form, literary works were written on long rolls made by gluing together pieces of papyrus or vellum. These are described under MANUSCRIPTS; see also BOOKBINDING. In ancient Assyria the equivalents of books were the stone tablets inscribed with cuneiform texts.

Form and Arrangement of Books. — The earliest printed books imitated closely the manuscripts which they quickly superseded, the types being based on the book-hands, or formal writing of professional copyists, then prevalent in different countries, and the arrangement being generally the same. Thus the earliest books have no title page, the information now given as to the place of printing or publication, name of printer or publisher, and date of issue, being either withheld altogether or placed in a colophon or crowning paragraph, such as author or copyist had been wont to write at the end of his manuscript. The Latin Bible printed at Mainz about 1455 has no colophon; that in the Psalter of 1457 may be translated: 'The present book of Psalms has been fashioned by an ingenious invention of printing and stamping, and to the worship of God diligently brought to completion, by Johann Fust, a citizen of Mainz, and Peter Schöffer of Gernsheim, in the year of our Lord 1457.'

In 1470 Arnold ther Hoernen at Cologne printed on a separate leaf a nine-line paragraph con-

taining the title of a Latin sermon and its date, and by about fifteen years later title pages had become common, though the two earliest English examples, that of *A Passing gode lityll boke necessarye and behovefull agens the Pestilens*, printed at Machlinia, and of *The Chastysynge of Goddes Chylde*, issued from Caxton's office probably after his death, both date from about 1490-1. For more than a century after this the colophon struggled with the title page for the right of giving the fullest information about the book. Both colophons and (when they came into use) title pages were frequently decorated with the mark or device of the printer, and subsequently of the publisher. The earliest printer's device is the two shields of Fust and Schöffer in the Mainz Bible of 1462; but the use of such devices spread less quickly in Germany than in Italy and France, in both of which countries they attained great beauty, the Italian designs being mostly conventional, while the French often introduce the figure of the printer's patron saint, the arms of the town, or the sign of his house. English devices were in many cases copied from the French. In the 16th century the printer's device became less important than that of the publisher, and gradually both died out, until the revival of English printing in the second half of the 19th century restored them both to occasional use. When not decorated by a device, title pages in the 16th century often displayed a woodcut illustration, and in the 17th the entire title page was frequently engraved on copper.

In most early books the leaves are left unnumbered, leaf numeration being first used by Arnold ther Hoernen at Cologne in 1471, making its way gradually,

and being slowly replaced by pagination during the 16th century. The preliminary leaves containing the author's preface or introduction, dedication, etc., were for a long time left unnumbered, and the use of Roman numerals for preliminaries and Arabic for the text is quite modern. To facilitate the work of the binder, the writers of manuscripts had been wont to mark successive sheets of their books with the letters of the alphabet, further indicating the order of the leaves in the sheet by numbering some or all of those in the left-hand half of the sheet. The use of these signatures was introduced into printed books by John Koelhoff at Cologne in 1477 and has continued to the present time--the letters J and U, which had no separate existence in the 15th century, and W, which was not recognized in Roman founts, being still omitted. In early Italian books a summary of the signatures was often given in a register at the end of the book.

Very elaborate printed capitals in the proper sense of the word--i.e. large initial letters at the beginnings of chapters or sections of a book--were used in Fust and Schöffer's Psalter of 1457; but throughout the 15th century spaces were frequently left blank for them to be filled in by hand, a small letter being sometimes printed to guide the rubricator. The *De Regimine Principum* of Egidius Columna, printed by G. Zainer at Augsburg in 1473, has not only printed capitals, large and small, but also headlines, chapter headings, and paragraph marks, all of which were frequently left to be added by hand in much later books. Decorative capitals became usual about 1490, and held their place in large books for rather over a century. The illustration of books forms the subject of a separate article.

The first printer of these was Albrecht Pfister at Bamberg, in 1461; and after 1470 they became common in Germany, and in another ten years in other countries also.

Size of Books.—This is determined primarily by the number of times the sheets of paper used in a book are folded, and secondarily by the trade names of the sizes of paper used. In a folio the sheet is folded only once, to form two leaves; in a quarto twice, to form four; in an octavo four times, to form eight. Other recognized sizes are duodecimo (12mo), sextodecimo (16mo), octodecimo (18mo, a French size), vigesimo-quarto (24mo), trigesimo-seculo (32mo), etc. When hand-made papers are used, the true size of a book, even when cut down in binding, can be told by the position of the wider water-lines—those in folios, octavos, 24mos, and 32mos being perpendicular; those in quartos, 12mos, and 16mos horizontal.

In the 15th century books were mostly published in large or small folio or quarto. In 1501 Aldus popularized octavos by beginning a series of editions of the classics in his newly-invented italics; in 1532 Sebastian Gryphius brought sextodecimos into fashion with a similar series of classics in smaller type; while a still smaller size, the 24mo, came into vogue at the end of the century. The duodecimo was a popular English size in the 18th century. The great majority of English books are now in octavo. See H. Bouchot's *The Book* (trans. 1890); C. T. Jacobi's *Some Notes on Books and Printing* (1902); A. W. Pollard's *Last Words on the Hist. of the Title Page* (1891), and *Early Illustrated Books* (1893); W. Roberts's *Printers' Marks* (1893); *The Localization of Books by their Bindings* (Biblio. Soc. Trans. viii., 1907);

and C. Davonport's *The Book* (1907). See also *Cambridge Hist. of Eng. Lit.*, ch. xviii., vol. iv. (1909).

Bookbinding. HISTORY.—Binding begins when the sheet of parchment or paper, instead of being rolled, is folded so as to form leaves of uniform size, the uncut sheet consisting of two, four, eight, twelve, or more leaves, according to the number of folds. Threads are then passed through each sheet where the folds come, and fastened at the back, strips of leather, string, or tape being attached to them, and glued on to the boards which form the covering of the book. The earliest English bindings which have come down to us date from about the 10th century, the boards being made of wood and covered with deerskin or other leather, on which numerous small stamps, from half an inch to an inch in size, containing figures of animals or conventional designs, have been impressed. By arranging these small stamps in circles, rectangles, and other patterns, the binders of Winchester, Durham, Oxford, and London, in the 11th and 12th centuries, produced excellent effects, and the English binders of this period were the best in Europe. Large panel stamps were subsequently used in France and the Low Countries, and were introduced into England in the 15th century. They are found on numerous books of the time of Henry VIII., some of them bearing the royal arms, others figures of saints or conventional designs. In the 12th and 14th centuries the boards of very valuable books, more especially copies of the gospels for use in church, were covered with carved ivory or metal, and frequently studded with gems. The famous 'Lindau Gospels' thus ornamented in gold and jewels, belonging to the Earl of Ashburnham, was sold to

Mr. J. Pierpont Morgan in 1901 for £10,000. Towards the end of the 15th century the use of gold leaf in the decoration of bindings was introduced into Venice from the East, and under the patronage of Jean Grolier (who became treasurer of the duchy of Milan in 1510), Tommaso Maioli, and other wealthy book-lovers, many beautifully decorated bindings were produced in Italy in the first half of the 16th century. On the return of Grolier to France the French school of binding speedily attained excellence, and, by the work of such artists as Nicolas and Clovis Eve (fl. 1560-90), Le Gascon (c. 1620), Du Seuil, Monnier, and the successive members of the families of Padeloup and Derfinc, continued pre-eminent till nearly the end of the 18th century. In Germany, where many good bindings in white pigskin were executed in the 16th century, gold-tooling arrived late, and never developed any originality. In Holland, Le Gascon found imitators in Poncyn and Magnus of Amsterdam. In England, with the assistance of Italian workmen, Thomas Berthelet, printer and bookbinder to Henry VIII., turned out some excellent bindings; and, under the patronage of Archbishop Parker, the workmen of John Day established a heavy and dignified English style, well suited to large folio volumes. Under both the Tudor and the Stuart kings various styles of embroidery were applied to bindings, the gaudy little prayer books in embroidered satin of the reign of Charles I. being quite inaccurately associated with the work done in the religious house maintained by John Ferrar and the Collets at Little Gidding. No embroidered bindings can be traced to this establishment, the books bound there being decorated with ordinary binders' tools

(mostly obtained from Buck of Cambridge), stamped sometimes on velvet, sometimes on leather. Under Charles II. the royal binder, Samuel Mearne, freely copied Le Gascon, his designs being often excellent. Their general effect is pleasing, especially when the tooling is combined with inlays of different coloured leathers. From the frequent use of a design, the top and bottom of which dimly resemble a roof, the bindings of Mearne and his successors are often spoken of as forming the 'cottage' style. In the first half of the 18th century many handsome bindings in red morocco, with a centre ornament in gold tooling, were executed for Robert Harley, Earl of Oxford. At the end of the century the work of Roger Payne combined, for the first time in England, originality, fine taste, and consummate workmanship. During the 19th century binding all over Europe suffered from the slavish imitation of old designs, varied by occasional attempts to introduce a larger style of decoration suitable for ornamenting the cloth cases of popular books.

MODERN INDUSTRY.—The requirements of modern publishing have made cheaper and speedier methods necessary, and practically every operation may now be performed by machinery. Modern bookbinders divide their work into the following sections:—(1) Folding the sheets into 'signatures,' gathering and collating these, sewing or stitching, endpapering, and trimming; (2) making the case or cover; (3) blocking or decorating the case or cover, also called 'finishing'; (4) gluing, rounding, and backing the book, and putting on the case or cover: these processes are included under the term 'forwarding.' Folding of small quantities is still done by hand. The printed sheets are cut into a convenient

size and folded once, twice, thrice, or four times, according to the number of pages in the sheet. The hand folder uses no tool except a small piece of wood or bone, like a paper-knife. Before a fold is made care is taken that the pages are placed exactly opposite each other, or 'in register.' The section of a book folded in each sheet is commonly known as a signature, and the usual signature contains sixteen pages; for thin papers, thirty-two pages. The technical name of each size of book is determined by the number of folds. (See article BOOK above.) Folding machines are now devised to make one fold (for a sheet of four pages), two folds (for eight pages), three folds (for sixteen pages), four folds (for thirty-two pages), and also to do the more unusual folds for twenty-four pages, forty-eight pages, etc. The simplest type of machine for ordinary bookwork makes three folds, and produces a folded signature of sixteen pages. To secure correct 'register,' the sheets are fed by the operator so that the edges are in contact with 'guides' at the front and side, or are 'pointed'—i.e. tiny holes, perforated in the sheet in the process of printing, are placed over steel points on the feeding-board of the folding machine. The feeding may also be done by an automatic attachment to the folding machine. The most efficient of all bookfolding machines is the quadruple (an American invention), which folds a sheet of sixty-four pages, cutting it into four sections of sixteen pages, each of which is delivered into a separate trough at the rate of from forty to forty-five large sheets per minute.

Gathering.—The folded signatures must next be gathered in complete books. This operation is done either by hand or by gathering machines, which have long rows of boxes for the signa-

tures, and moving fingers which take out one signature at a time. They deposit these in proper order on a moving band, and forty complete books can thus be gathered in a minute. Gathered books must next be *collated*—i.e. looked over to see that the sections are in their proper order.

Sewing and Stitching.—Hand-sewing is done in frames across which are stretched in a vertical position the cords or tapes on which the books are to be sewn. Small holes are sawn in the backs of the signatures, and through these the sewer passes the needle in and out round the cords or tapes. It would be impossible to explain or illustrate all classes of book sewing machines, but it will suffice to mention the two most commonly used. The first is the machine generally used for bookwork. The operator feeds the signatures on a radial arm which carries them into the machine, where they are firmly sewed. The second machine is a wire-stitcher which cuts off from a reel a small piece of wire, forms it into a staple, forces it through the paper, and turns over the ends of the wire. These ingenious machines can wire-stitch a book one inch in thickness.

End-papering.—At the front and back of the book a strong paper, called 'end-paper' or 'waste-paper,' is now fixed. By this the book will afterwards be pasted to its cover.

Trimming.—After sewing, the books have their edges trimmed (unless bound with uncut edges) on a guillotine. The simplest form of guillotine is a metal table with guides to place the books in proper position, a press (platen) to hold them firmly, and a descending knife to cut the edges. In this form of machine books must be inserted three times to get their 'heads,' 'tails,' and 'foredge' cut. Other forms

have been devised with either one or two knives in which the books are placed on turn-tables, all three edges being cut consecutively, without moving the books.

Gluing.—The trimmed books are now glued on the back with a brush, to harden them and make them more solid.

Rounding and Backing.—When the glue is dry, the books are ready for the next two operations—viz. rounding the backs, a term which explains itself; and 'backing'—i.e. making the little projections at the side against which the cover opens as on a hinge. These operations are done in small binderies by hammering the glued backs roughly into a curve, then fixing them in a vice and passing a roller over the backs. In large binderies the two operations are performed at once by a rounding and backing machine.

Linting.—The next operation is the pasting on of mull or paper, or both, to the rounded back to give additional strength to the book. When this is done the book is ready for casing.

Case-making.—In binding ordinary cloth books, the covers or 'cases' are made before they are attached to the books. The materials required are coloured cloth, straw boards for the sides, and thick paper to stiffen the back. All these are cut to the exact size required. The cloth is glued with a brush, the boards and stiff paper are laid on by gauges, and then the edges of the cloth are turned over, a piece being cut off each corner to prevent a thick fold. Case-making is now done in large binderies by machines. The operator feeds the cloth to guides. The machine glues it, places the boards and stiff paper in position, and completes the case.

Finishing the Case.—Modern cloth books must receive some

ornament on the covers, and this is done either by the hand work already described or by machine—'blocking.' By this latter method metal stamps, on which the design for the back and sides is cut, either emboss the cover or print it with ink or gold. In the gold process, known as 'gold blocking,' leaves of very thin gold are laid on the covers at the spots where a gilt design is required; the design is then stamped in with a hot metal stamp, and the surplus gold leaf not impressed by the stamp is brushed off the cover.

Casing.—The book being now ready for its cover, and the cover being prepared for the book, there remains only the operation of pasting the two together. After being pressed for a few hours, the book is ready for delivery.

It would be impossible to describe in detail the progress of many other classes of work which pass through binders' hands. A few words may, however, be added about some distinctive features of other work with which every reader is familiar.

Edges.—Ordinary cloth work has plain edges either trimmed, as already described, or 'deckle-edged'—i.e. rough and uncut—when an antique paper has been used. Very often, however, trimmed edges are dyed with red or some other colour, or 'sprinkled' with spots of mixed colours. These coloured edges, again, may be either dull or 'burnished' by hand.

Many fine books are bound with gilt edges or gilt tops. The books, after trimming, are fastened in a press; the edges are scraped smooth, and sized; gold leaf is then laid on, and when dry is burnished with a tool by hand till it shines brightly. In Bibles, etc., a colour is washed over the edges before gilding, producing the beautiful 'red under gold' edges.

Leather Binding.—In the finest

work, or when great strength is required, a leather cover is not completed separately from, but, as it were, built up round the book, and finished when attached to it. In recent years, however, leather bindings have become so common that most of the leather covers are now made and finished separately like cloth cases. In the old-fashioned way the leather cover adhered to the back of the book, but was made so supple that the book opened freely. In the more modern style of leather binding, as in ordinary cloth work, the back of the book and the back of the cover are not fixed together, and when the book is opened they curve in opposite directions and a hollow appears between them; hence the expression 'hollow back.' The cheapest leathers in use for book-binding are split sheepskins (commonly known as 'skivers'). Next come sheepskins of the full thickness of the hide; then persians — the skins of Persian goats; and lastly fine moroccos. The persians, moroccos, and other fine leathers have beautiful natural grains, but the same appearance is given to both fine and common leathers by stamping them in a machine with a metal plate. See **LEATHER**.

Leather bindings may be roughly divided into (1) full leather or 'bound' books, in which the whole cover is leather; (2) 'half-bound' books, with leather back and corners, the rest of the cover being paper or cloth; and (3) 'limp' books. In the two first classes the basis of the cover is a stiff board; in the third the cover is made as flexible as possible. Bound and half-bound books are generally made with 'hollow backs,' but in limp leather bindings, which have recently become very popular in Dent's Temple Classics, Nelson's New Century Library, etc., the

covers are always pasted to the backs of the books.

Loose-leaf Binding. — Within comparatively recent date a new and ingenious method of binding has been adopted — the 'loose-leaf' system — whereby leaves may be added or removed by a simple mechanical arrangement. The device is chiefly valuable in works of reference like encyclopædias, where it is important to keep the matter perpetually up to date. Probably the best example of the loose-leaf binding is Nelson's comprehensive bibliography entitled *Standard Books* (1910).

Bibles. — A very large proportion of leather binding is done for Bibles and Prayer Books. For an example of fine leather bindings done in large quantities at cheap prices, nothing is more wonderful than the beautiful flexible Bible work of Eyre and Spottiswoode and other Bible firms. Nearly all Bible work comes under the class of cased work, and the two prevalent styles are known as 'limp' (i.e. soft leather covers without flaps) and 'divinity circuit' or 'yapp' (i.e. soft covers with a projecting flap turned over to preserve the book). 'Bible work,' and especially Prayer Books, give great scope to the binder for introducing round corners, pretty gold lines, and ornaments both inside and outside the cover, and tasteful linings of paper or leather for the inside of the covers.

Stationer's Binding, or the manufacture of account books, etc., is a distinct branch. These books must be specially strong, and the covers are securely fastened to the books at an early stage, and completed while fixed to the books themselves.

A bibliography of works on binding is printed at the end of Miss S. T. Prideaux's *Historical Sketch of Bookbinding* (1893), itself an excellent work. Other good

books are H. P. Horne's *The Binding of Books* (1894); W. Y. Fletcher's *Bookbinding in England and France* (1896); C. J. Davenport's *Royal English Bookbindings* (1896); and *English Embroidered Bookbinding* (1899). The best collections of coloured illustrations of bindings are the *Catalogue of the Exhibition of Bookbindings at the Burlington Fine Arts Club* (1891); *Examples of Bookbindings* (1894); Fletcher's *English Bookbindings in the British Museum* (1895), and *Foreign Bookbindings in the British Museum* (1896). The technical processes of bookbinding are briefly described in Mr. Horne's book quoted above, and more fully in J. W. Zaehnsdorf's *The Art of Bookbinding* (1890), Douglas Cockerell's *Bookbinding and the Care of Books* (1901), also in Stephen's *Commercial Bookbinding* (1910).

Book Clubs. Before the growth of circulating libraries clubs were formed in many country towns and districts for the purchase of the best popular books of the day, and their distribution among the members in rotation. At the end of the year the books purchased were mostly put up to auction at a meeting of the club, and the sum realized carried forward to the next year's purchases. Some famous clubs, not for the circulation but for the printing of books (e.g. the Roxburghe, Maitland, Abbotsford, and Bannatyno), were formed at the beginning of the 19th century. In 1905 the *Times* founded a book club for the gratuitous distribution of books to subscribers to the paper. What is known as the 'Book War,' which was waged by authors, publishers, and public alike for a couple of years, arose owing to the 'Times Book Club' selling surplus new books at greatly reduced prices. The most notable instance was

that of *The Life of Lord Randolph Churchill*, which was sold at one-fifth of its published price. The protestations of the booksellers resulted in the rule formulated by the Publishers' Association in conjunction with the Booksellers' Association that net books could not be sold to the public below the full price until after the lapse of six months, and then only if secondhand. The 'Book War' was satisfactorily terminated in 1908.

Book Collecting. Books are acquired by collectors for their rarity, because they are first editions, or because they are finely printed, bound, or illustrated. Save in the case of the very rarest books, only copies which are perfect, clean, and with their margins uncropped, have any value. The collector's spirit may be traced in the *Philobiblon* of Richard de Bury (d. 1345), and in the 16th century in the zeal with which Archbishop Parker and Sir Robert Cotton secured what they could of the wreckage of the English monastic libraries. During the 17th century interest began to be taken in early specimens of printing. The introduction from Holland in 1676 of the practice of selling old books by auction (the first English library thus sold was that of Dr. Lazarus Scamman) greatly increased collecting, which steadily grew throughout the 18th century, and for a short time at the beginning of the 19th was a fashionable and aristocratic pastime. First editions of the Greek and Latin classics and the finer specimens of 15th-century printing were chiefly sought after by the collectors of that day. The early classics, together with the Aldine and Elzevir editions, declined in value during the century; but all finely illustrated books (more especially illuminated manuscripts and French and Italian early printed editions), specimens of early

printing, first editions of English classics, and books relating to the early history of America, steadily increased, the rise during the twelve years 1891-1902 being especially rapid. Among the most famous English sales of the 19th century were those of the libraries of the Duke of Roxburgh, 1812 (£23,397); Richard Heber, 1834-6 (£56,774); Earl of Sunderland, 1881-3 (£56,581); Wm. Beckford, 1882-3 (£73,551); and Earl of Ashburnham, 1897-8 (printed books, £62,712, exclusive of the mss. which were sold privately). The Gutenberg Bible (c. 1455) on vellum rose in price from £504 (Nicol's sale, 1825) to £4,000 (Ashburnham, 1897); on paper from £199, 10s. (Sykes, 1824) to £3,900 (Thorold, 1884); and in the case of a copy privately sold by Quaritch, to £5,000; the Latin Psalter printed at Mainz in 1459, from £136, 10s. (Sykes, 1824) to £4,950 (Thorold, 1884); the folio Shakespeare of 1623, from £121, 16s. paid by Mr. Crenville in 1818 to the £1,720 paid at Christie's in 1901. Of the rise in value of books printed by Caxton, the most remarkable instance is that of the Royal Book, of which a splendid copy sold in 1815 for £85, and subsequently in 1819 for £73, 10s., and in 1829 for £61, 19s. In 1901 one copy fetched £1,550; in 1902 another, £2,250. At the Scott of Halkhill sale (March 1905) Caxton's *Chronicles of England* brought £102, in comparison with £45 fifteen years ago. The Kilmarnock edition of Burns has also risen steadily in value, reaching the record price (£1,000) paid for the copy sold privately by Mr. Veitch of Paisley, and secured by the Burns' Cottage Trustees at Ayr (1903), the previous record being that of £572, 5s. paid for the Lamb copy (1898). See the annual volumes of Slater's *Book Prices Current*, Dauze's *Repertoire des Ventes*

(1894), Livingston's *American Book Prices Current* (1895), and Mr. H. B. Wheatley's comprehensive work, *Prices of Books* (1898). On collectors and collecting the best works are Elton's *Great Book Collectors* (1893), Quaritch's *Contributions towards a Dict. of English Book Collectors* (1892-9), Fletcher's *English Book Collectors* (1902), Hazlitt's *Book Collector* (1904), and Pollard's *Books in the House* (1907).

Book Illustration. See ILLUSTRATION OF BOOKS.

Bookkeeping. Bookkeeping is a method of recording business transactions in such a way that from these records a person may readily ascertain the financial position of a business undertaking or any department of it. A good system of bookkeeping will show the state of any account, whether of ordinary trade debtors and creditors, of goods or property, or of the expenses connected with a business, and will enable a qualified person to make up a statement at any time showing the gain or loss involved, or determine the solvency or insolvency of the business. Correct bookkeeping is essential to enable a merchant to understand his position and the extent of his obligations and resources, and many bankruptcies can be traced to careless or inefficient bookkeeping.

The art of bookkeeping in one form or another must be as old as civilized trading, but its present form can be traced back only to about the end of the 15th century, when it was in use among the merchants of Venice and other commercial cities of Italy; hence the system of double entry was known as the Italian system. In the succeeding century it seems to have gained a footing in England.

There are two systems of bookkeeping used, single entry and

double entry—the former being only a part of the latter, and so incomplete.

Single Entry.—In this system only the personal accounts—i.e. those dealing with persons, not with property, goods, etc.—are dealt with, and a transaction is only entered once; whereas in double entry each transaction is entered in one account as a debit, and in another as a credit. The single system is much used by small traders, as its simplicity and minimum of trouble recommend it; but its disadvantages far outweigh its advantages in all but the smallest businesses. Some of these disadvantages are, that there is no check against fraud nor against errors and omissions in posting; there is no

The books necessary for single entry are: (1) day-book, in which the sales and purchases are entered; (2) cash-book, in which all cash transactions appear; and (3) the ledger, in which an account is opened for each person to whom goods are sold, or from whom goods are purchased, on credit.

When single entry is used, a proper balance sheet and profit and loss account should be made up once a year, by an accountant, in double-entry form. This, in a rough way, is possible by incorporating information derived from other sources than the ledger.

Double Entry.—This is in practice the only satisfactory system of bookkeeping, and well repays the extra trouble entailed in its

SINGLE ENTRY BALANCE SHEET.

1900.		<i>Liabilities</i>					
		£	s	d			
Jan 1.	Capital.	1400	0	0			
Dec 31.	Due to creditors	840	0	0			
	Balance, being profit.	350	0	0			
		<u>2540</u>	<u>0</u>	<u>0</u>			

1900.		<i>Assets</i>					
		£	s	d			
Dec. 31.	Due by debtors	1350	0	0			
	Goods, etc., on hand	1140	0	0			
	Cash in bank	130	0	0			
	.. on hand	10	0	0			
		<u>2640</u>	<u>0</u>	<u>0</u>			

means of showing from what department or class of goods the profit or loss has arisen, and, as a consequence, unprofitable business may be nursed, while profitable business may be dropped, with dire future results; nor are the expenses shown in such a way as to enable a comparison to be made between these expenses and the turnover, so that any increased or decreased ratio may be discovered. A balance is simply made up by taking the capital at the beginning of the period, adding to that the present liabilities (if any), and comparing the total with the assets possessed at the end of the period in cash, goods, sums due, etc. The difference between the totals is profit if the latter be the greater, loss if it be smaller.

working. The basis on which it rests is that every debtor (Dr.) must have a corresponding creditor (Cr.), every buyer implying a seller. If A buys goods from B, A must in his ledger give B credit for their value (i.e. Cr. B); and as goods are received, the goods account must be charged with the value (i.e. Dr. goods).

The account or person receiving anything is always debited, and the account or person parting with anything is always credited. A person is thus *debtor* for what he *gets*, and *creditor* for what he *gives*. The total of the debits and credits in a ledger should thus always be equal, if the posting has been correctly done.

The contraction Dr. is used in practice for debtor or debit, and

similarly Cr. is used for creditor or credit.

The following examples and explanations of the various books will outline the methods of double entry.

Day-book or Sales-book.—This is the book into which sales are entered in detail; they are then posted to the debit of the buyer's account in the ledger; and periodically—say monthly—the total of the sales is posted to the credit of goods account, the goods having been parted with.

The *Invoice or Purchase book* is used to record goods bought, and is entered up in the same way as the day-book, substituting 'By' for 'To.' The sums are posted to the credit of the person's account from whom the goods are

are three columns on each side, for discount, bank, and cash; this form shows the state of the bank account at a glance. A cash-book with several columns on each side is useful in saving clerks' time, the receipts and payments being at once classified by entering into the proper columns.

The transactions have been as follows:—On Jan. 11, A. Thomson paid £95 by cheque, and was allowed £5 of discount; on Jan. 13, R. Smith paid £30 in cash, and was allowed £2 of discount; on Jan. 16, G. Park was paid £75 by cheque, and allowed me £11 discount; and on Jan. 17, W. Inglis was paid £5 in cash. Note that all cheques received must be banked in full.

The *Ledger* is the most impor-

DAY-BOOK.*

		£	s.	d.	Folio	£	s.	d.
Jan. 10.	J. Bruce and Co.							
	To goods (give details)	10	0	0	In			
	" " " " " "	10	0	0	Ledger			
					7	20	0	0
" 15.	R. Simpson and Son							
	To goods (detail)....				25	65	0	0
" 31.	J. Robertson,							
	To goods (detail)....				83	33	0	0
Sales for month: By goods account, folio 50.....						118	0	0

purchased, and periodically to the debit of the goods account.

In the foregoing books the totals have been posted to the goods account, but in practice this account is subdivided into special accounts, and the day-book and invoice-books would be adapted for this object by having several money columns in place of the two shown.

Cash-book.—The book into which all cash, cheques, etc., are entered—what is received on the debit side, and what is paid on the credit side: e.g. if B pays an account to you, cash is received; therefore cash must be debited, and B credited with the amount, which is done in posting to B's account. An excellent form of cash-book is one in which there

tant book in bookkeeping. It is not a book of original entry, but to it the entries in all the other books are posted. In it all the recorded transactions are classified. An account is opened for each debtor and creditor of the business (called Personal Accounts); for goods, property, etc. (called Real Accounts); and for such accounts as wages, rent, profit and loss account, etc. (called Nominal Accounts). A ledger account would appear as on page 122.

In large businesses it is convenient to have more than one ledger in use—e.g. Town Ledger and Country Ledger, A-L Ledger, M-Z Ledger, Debit and Credit Ledgers, and so on.

Bill-book.—This is generally purchased ready ruled and printed

CASH-BOOK.

Fol.	Discount	Bank.	Cash.	Fol.	Discount	Bank.	Cash.
	£ s. d.	£ s. d.	£ s. d.		£ s. d.	£ s. d.	£ s. d.
Jan. 11. To A. Thomson ..				Jan. 16. By G. Park			
" 13. " R. Smith	5 0 0	95 0 0	30 0 0	" 17. " W. Inglis,	11 0 0	75 0 0	5 0 0
" Balance (of dis- count received posted to the Dr. of discount account in ledger)	2 0 0	..	..	" on hand, car- ried forward ..	..	..	25 0 0
	4 0 0	..	..	" Balance in bank, carried for- ward .....	..	20 0 0	..
Feb. 1. To Balances brought forward	11 0 0	95 0 0	30 0 0		11 0 0	95 0 0	30 0 0
	..	20 0 0	25 0 0				

from the stationers. It is usually in two sections—one for bills receivable, the other for bills payable; and in it the particulars of each bill are entered—date, currency, when due, amount, etc. The individual bills are posted from it to the Dr. and Cr. of the Personal Accounts, and the totals periodically to Bills Receivable and Bills Payable Accounts in the ledger.

Journal.—This book is very useful in double-entry bookkeeping for opening and closing entries, transfers from one ledger account to another, etc.; but by many bookkeepers it is used to quite an unnecessary extent. Its use is mainly to explain why certain accounts are debited and credited—i.e. to preserve a proper record of the transfer. In the following instances the journal would be used: (1.) A begins business with £1,000, which is deposited in bank. (2.) An error is made in posting £20 to the credit of B instead of C. (3.) In balancing the books, goods on hand are valued at £500, and this amount is to be carried forward to begin the new goods account. The Drs. and Crs. in this book are thus always equal.

Subsidiary Books, as Wages Book, Petty Cash-book, etc., are necessary in most businesses, and the uses of these are obvious.

Trial Balance.—This is simply a statement in two columns of the balances, Dr. and Cr. respectively, on each account in the ledger; and the totals of these columns, if equal in amount, show that the ledger balances; and the presumption is that the books are correct. Cash in hand must be added in to the Dr. column.

Profit and Loss Account.—This account, made up from the ledger, shows the gain or loss on the business for the period it includes.

Balance Sheet.—This is a statement showing the financial position of the business at a given date.

Card or Separate Sheet Ledger.—Instead of having the ledger as a bound volume, each account in this system is kept on a separate loose sheet or card, and these are arranged alphabetically. Its use is favoured in America by merchants, insurance offices (cards generally), and other companies, and has several distinct advantages.

quently used in business transactions:—

Bills, Acceptances, and Promissory Notes are written agreements, on stamped paper, to pay a sum of money at a particular future date, say one month, three months, and so on. 'Three days' grace' is given before the bill is legally due—*e.g.* if a bill at one

LEDGER ACCOUNT. A. BROWN AND CO.

Dr.			Cr.		
	£	s. d.		£	s. d.
Jan. 3. To goods (sold to them) . .	50	0 0	Jan 25. By cash (received) . . .	47	0 0
" 10. " " " " . . .	50	0 0	Discount (allowed) . . .	3	0 0
" 17. " " " " . . .	10	0 0	" 23. " cash	18	0 0
			Discount	2	0 0
			" Balance carried forward	10	0 0
	80	0 0		80	0 0
Feb. To balance brought forward	10	0 0			

tages. Thus, accounts which are closed, or sheets completed, may be removed, leaving only the active accounts in view. Accounts can be classified or grouped to suit the convenience of the business, and can be apportioned among several clerks; there is also a saving of time in indexing, and especially in doing away with the opening of new ledgers. Against

month is dated February 3, the due date would be March 6. No days of grace are allowed on bills payable 'on demand' or 'at sight.'

A *Cheque* is a written request to your banker to pay over to 'Bearer' or 'Order' (*i.e.* to the order of the person named therein) the definite sum of money stated on the cheque.

JOURNAL.

	Dr.	£	s. d.	Cr.	£	s. d.
Jan. 1. Bank	Dr.	1000	0 0	Cr.	..	..
To A, being the capital with which A begins business	Cr.	..	..	Dr.	1000	0 0
May 10. B	Dr.	20	0 0	Cr.	20	0 0
To C, for item posted in error to B	Cr.	..	..	Dr.	..	..
Dec. 31. Goods new account	Dr.	500	0 0	Cr.	500	0 0
To goods old account, for value of goods on hand	Cr.	..	..	Dr.	..	..
		1520	0 0		1520	0 0

this, of course, must be set the risk of loose sheets getting lost if carelessly kept. Similarly, original entries may be made on cards or slips, and these passed on from one clerk to another to enter from the original record, thus forming a check on the entries and saving much time.

The following are terms fre-

Capital.—This is the excess of assets over liabilities, and theoretically is a debt due by the business to the owner thereof. Similarly, in a limited company the capital subscribed by the public—*i.e.* the cash paid by them for shares—is a debt due by the company to the individual shareholders. In the event of a wind-

ing up, all other debts take precedence of this one; and when they are paid, the balance, if any, remains to satisfy the owners or shareholders. Capital may consist of cash, goods, property, etc.

Partnership is an arrangement between two or more persons for business purposes. A deed of partnership should be drawn up,

count on the amount of the bill, but also discount on discount: thus, the banker's discount, say at 5 per cent. per annum, on a bill at three months for £400, would amount to £5—i.e. £5 is being paid for the use of £395 for three months = £5, 1s. 3d. per cent.

Goodwill.—In purchasing a business as a going concern, a sum

PROFIT AND LOSS ACCOUNT.

PROFIT AND LOSS ACCOUNT.

Dr.		Cr.	
	£ s d	£ s d	
Jan. 1. Office expenses	300 0 0	Dec. 31. Goods account (being the balance on this account after allowing for value of the goods on hand)	1750 0 0
Salaries	400 0 0	Discount account (being the excess of discount received over discount allowed)	50 0 0
Rent and taxes	160 0 0		
Bad debts	40 0 0		
	<hr/> 900 0 0		
Profit (this add to capital account)	900 0 0		
	<hr/> 1800 0 0		<hr/> 1800 0 0

defining each person's rights and share in the profits, assets, etc., of the business.

Depreciation.—A deduction corresponding with the estimated depreciation of value, through use or otherwise, is made—usually as a percentage each year—from the value of assets such as machinery, office furniture, stock, etc.

varying with the clear annual profit and other circumstances has to be paid for goodwill—i.e. for the value of the firm's name and established connection acquired by the purchaser.

The books on the subject of bookkeeping are very numerous, not only on the art generally, but on many special branches of it, as

BALANCE SHEET AT 31ST DECEMBER.

Liabilities.	£ s d.	Assets.	£ s d.
Sundry creditors	1130 0 0	Sundry debtors	1200 0 0
Rent accrued, not yet paid	30 0 0	Cash in bank	200 0 0
Bills payable	560 0 0	Cash on hand	10 0 0
Capital—i.e. the sum due to the partners of the business	2780 0 0	Goods on hand	2290 0 0
		Machinery	650 0 0
		Office furniture	150 0 0
	4500 0 0		4500 0 0

Discount.—This is either (1) an allowance, say for prompt cash, made to a buyer, or received from a seller of goods; or (2) a charge for interest and risk made by a banker when a bill is handed to him for collection at its due date, and the amount of which is to be placed to the credit of the customer's account. In bill transactions it includes not only dis-

merchants', shopkeepers', solicitors', stockbrokers', bankers', insurance, etc., bookkeeping. See E. T. Jones's *Bookkeeping by Single and Double Entry*; Carter's *Practical Bookkeeping*; Thornton's *Manual of Bookkeeping*; Pixley and Wilson's *Bookkeeping*; Parry's *Double-Entry Bookkeeping*; J. W. Heaps's *Antiquity of Bookkeeping*; Pitman and Sons' *Ad-*

vanced Bookkeeping (including Limited Company Forms, etc.); L. R. Dicksee's *Bookkeeping for Accountant Students* (1897); Geo. Lisle's *Accounting in Theory and Practice*; D. A. Koister's *Corporation Accounting and Auditing*; A. D. L. Turnbull's *Life Office Accounts on the Card System*; *Proceedings of Actuarial Society of Edinburgh*, vol. iv. No. 7.

Book-land. See BOCLAND.

Book-lice, a name applied to the insects of the family Psocidae, also called lesser death-watches. See DEATH-WATCH.

Bookmaker. See BETTING.

Book of Common Prayer. See PRAYER BOOK.

Bookplates. In the 15th century it became common, especially in Italy, to introduce the arms of the owner of a fine book into the illuminated border round the first page of text; and in a few woodcut borders to books printed by Erhard Ratdolt and other printers in Italy blank shields are conspicuous, in which the owner's arms might be inserted. The printing of separate labels to be pasted into a number of volumes began in Germany towards the close of the same century, the example usually quoted as the earliest being that found in the books presented by Hildebrand Brandenburg of Biberach to the Carthusian monastery at Buxheim about 1480, though the woodcut itself is probably ten or twelve years later. Early in the 16th century the designing of bookplates engaged the attention of many German artists, notably Albrecht Dürer, Lucas Cranach, and Hans Holbein. In France, Jean Berthaud de la Tour-Blanche used a bookplate as early as 1529; but only one other of French ownership in the 16th century has yet been traced. In England, a woodcut with the donor's arms and a printed inscription was placed in books presented by Sir Nicholas

Bacon to the University of Cambridge in 1574 - the first English bookplate denoting personal ownership being that of Sir Thomas Tresham, which is dated June 29, 1585. Until the second half of the 17th century the use of bookplates was rare both in France and England, most owners preferring to stamp their arms or names on the leather covers of their books. Towards the end of the century bookplates increased rapidly in England, and for about a dozen years from 1698 there is a curiously large number of English bookplates bearing the dates of the years in which they were engraved. The styles of English bookplates have been distinguished as 'Simple Armorial,' with no ornament save heavy mantling; the 'Jacobean,' in which the shield mostly rests on a bracket and is surrounded by a frame; 'Chippendale,' in which the frame takes the form of a border of open shell-work; and 'Wreath and Ribbon,' whose decoration resembles that of Sheraton furniture. When bookplates became fashionable, about 1880, armorial designs were largely supplemented by pictorial and emblematic ones. Until about the date just mentioned the collecting of bookplates was hardly known, but it sprang suddenly into favour, and some ten years later began to produce quite a large literature. The first great collection in England was formed by Sir Wollaston Franks, and bequeathed by him to the Print Room of the British Museum. Bookplates mostly bear inscriptions, and from the frequency with which these begin with the words *Ex libris*.... (i.e. one of the books of....) these two words have been adopted as a convenient international name for them. *Ex libris* societies have been formed in England (1891), Germany (1891), France (1894), U.S.A. (1896), and Austria (1903);

and periodicals are issued in London, Paris, and Berlin. See H. W. Fincham and J. W. Brown's *A Bibliography of Bookplates* (1892); Hon. J. Leicester Warren's (Lord de Tabley) *A Guide to the Study of Bookplates* (1880; new ed. 1900); Labouche's *Ladies Bookplates* (1895); Vinycomb's *Processes for Production of Ex Libris* (1894) and *The Book of Bookplates* (1908); H. W. Fincham's *Artists and Engravers of British and American Bookplates* (1897); Allen's *Early American Bookplates* (1894); Eger-ton Castle's *Eng. Bookplates* (1899; new ed. 1893); W. J. Hardy's *Bookplates* (1893; new ed. 1897); J. Guthrie's *Bookplates* (1909); W. Hamilton's *French Bookplates* (1892; new ed. 1896); Count K. E. zu Leiningen-Westerburg's *German Bookplates* (trans. 1901); Bartarelli and Prior's *Gli Ex-libris Italiani* (1902); Warnecke's *Die Deutschen Bücherzeichen* (1890); and Gerster's *Die Schweizerischen Bibliothekszeichen* (1898).

Books, BEST HUNDRED. In a lecture delivered in the Working Men's College in London in January 1886, under the title *On the Pleasure of Reading*, Sir John Lubbock (Lord Avebury) suggested a list of 'the best hundred books,' the works of living authors being omitted. An amended selection appeared in the *Contemporary Review* for February 1886. See *Pall Mall Gazette* 'Extra,' No. 24: 'The Best Hundred Books.'

Books burnt by order. Probably the most drastic holocaust of books burned by order that history records occurred in the year 221 B.C., when the Emperor Chi Wang-ti, of the Chinese dynasty of Tsin, desiring to destroy the power of tradition, caused all the books in his empire to be burned, except works on divination, agriculture, and medicine. And occasionally in the ancient classic writers mention is made of the burning of obnoxious or incon-

venient books; among others, the works of Pythagoras are said to have been burned at Athens. Thus the burning of heretical books is not a Christian invention. The destruction of Christian books formed part of the heathen persecution of Diocletian, who in A.D. 303 ordered all such writings to be burned. The introduction of the practice among Christians is ascribed to Osius, bishop of Cordova, who persuaded Constantine to order the writings of Arius to be committed to the flames, while similar treatment was afterwards meted out to the writings of Nestorius and Honorius. Abelard was in 1121 condemned to burn his own *Introductio ad Theologiam*, because of its false teaching with regard to the Trinity. Book-burning was inaugurated in England by the destruction of copies of the Antwerp edition of Tyndale's New Testament at St. Paul's in 1527, followed by the burning of a second edition in 1530. Among other books ordered to be burned were Suarez's *Defensio Catholice Fidei contra Anglicanæ Sectæ Errores* (1613), burned by order of James I.; Barker's Bible and Prayer Book (1631), in which the word 'not' was omitted in the seventh commandment; Luther's works, at St. Paul's (1530); Tyndale's *The Wicked Mammon* and *The Obedience of a Christian Man* (1546); Simon Fish's *The Supplication of Beggars* (1546); Anon., *The Revelation of Antichrist* (1546); Simon Fish's trans. from the German of *The Summary of Scripture* (1546), and all the works of Frith, Tyndale, Wycliffe, Joy, Rowe, Basil, Bale, Barnes, Coverdale, Turner, and Tracy; J. Hales's *Declaration of the Succession of the Crown of England* (1563); R. Doleman's *Conference about the next Succession* (1594); J. Stubbes's *Discovery of a Gaping Gulf* (1579); G. Martin's *A Treatise of Schisme* (1584); A. Leigh-

ton's *An Appeal to the Parliament* (1628); W. Prynne's *Histrionastix* (1633); *The Letany of John Bastwicke* (1637); Milton's *Eikonoklastes* (1660) and *Defensio* (1660); Anon., *The Memorial of the Church of England* (1705); H. Sacheverell's *Sermons* (1710); Defoe's *Shortest Way with Dissenters* (1703); John Wilkes's *North Briton* (1763); Wood's *Athenæ Oxonienses* (1693). A book, *Hutchinson's Commercial Restraints of Ireland Considered*, was burned as late as 1779. In the interval there were many others. The *Medulla Theologicæ Moralis* of the Jesuit Busenbaum was burnt at Toulouse in 1757, as encouraging assassination. There is a French book on the subject, *Dictionnaire... des principaux Livres condamnés au Feu*, by G. Peignot (1806). See also *Edinburgh Review*, July 1871, article entitled 'Suppressed and Censured Books.'

Book-scorpion, general name given to members of the arachnid order of Pseudoscorpionidae, which includes minute animals living chiefly in warm countries in old books, under bark, etc.

Book Trade. See PUBLISHING.

Book War. See BOOK CLUBS.

Bookworms, the popular name given to several insects or their larvæ, which feed on the paste used in binding books, and bore holes both through the binding and through the pages of the book itself in order to get it. The commonest and most mischievous of bookworms are the *Sitotrupa panicea*, found both in the larval form and as a full-grown insect, and the larva of *Attagenus pello*; others are *Lepisma saccharina*, *Plinus fur*, *Dermestes lardarius*, and the larva of *Anthrenus varius*. Brushing and cleaning, fresh air and use, are the best preservatives against bookworms; but subjection to considerable heat and sprinkling with pure pyrethrum

powder are approved remedies. A full discussion of the subject is given in O'Connor's *Facts about Bookworms* (1898); and there is also a chapter on bookworms in Blades's *Enemies of Books* (1880).

Boole, GEORGE (1815-64), English mathematician and logician, was born at Lincoln. In 1849 he was appointed professor of mathematics in Queen's College, Cork. He published important textbooks on *Differential Equations* (1859) and on *Finite Differences* (1860), and contributed 'Theory of Analytical Transformations' to *Cambridge Math. Jour.* (1839), and 'General Method in Analysis' to *Phil. Trans.* (1844). His most remarkable work, however, was the *Laws of Thought* (1854), in which symbolic language and notation were employed to express purely logical processes. See Life by R. Harley in *Brit. Quart. Rev.*, 1866.

Boom, the spar attached to the mast at its forward end, and controlled by the sheet at its after end, which extends the foot of the sails abaft the masts in the fore-and-aft rigs. (See SHIP, YACHT.) Also any spar projecting abeam to which the boats of a ship at moorings may be made fast, or the supports for the torpedo nets. Also the barrier of timbers, chains, or other material extended across the mouth of a harbour to prevent the entrance of hostile vessels.

Boom, tn., prov. Antwerp, Belgium, 11 m. by rail s. of Antwerp; has brickworks, salt-pans, and tanneries. Pop. 17,000.

Boomerang, a missile weapon of the Australian aborigines, is a curved piece of hard wood, somewhat resembling a scimitar, about three feet long and three inches wide, flat on one side and slightly rounded on the other, with a sharp edge. It is thrown with the convex or cutting edge pointing towards the object aimed at. Its

great characteristic is that, if it encounters no heavy obstacle in its flight, it begins, owing to its peculiar shape, a retrograde motion when its first force is spent, and thus returns to the place from which it has been thrown. A very slight impediment does not check its outward course, for it has been known to slice off the head of a flying bird and yet return to the thrower. It is a keen and deadly weapon, and usually inflicts a fatal wound, whether the object it strikes is a bird in the air or a man or other animal on the ground. Its impact with any solid obstacle, of course, absorbs its motion, and it falls to the ground.

Boomplaats, S. Africa, site of a battle between the Boers and the British in 1848, in which Sir Harry Smith defeated Pretorius. It lies in the Fauresmith division of the Orange Free State prov., not far from Zwart Koppies, or the black hillocks.

Boondee. See BUNDI.

Boone, city, Iowa, U.S.A., co. seat of Boone co., 37 m. N.N.W. of Des Moines, with railway and machine shops, flour-mills, and tobacco factories. Large deposits of potter's clay are found in the vicinity. Pop. 11,000.

Boone, DANIEL (1735-1820), American pioneer and explorer, born in Bucks co., Pennsylvania. Emigrating in 1752 to N. Carolina, he proceeded to Kentucky (1769) on a hunting expedition, was captured by Indians, but escaped, and reached home (1771). Then he built a fort at Boonesboro' (1775), on the Kentucky R., was attacked by Indians (1777), and in the following year was captured and carried to Detroit. Escaping four months later, he returned to Boonesborough, and resisted with 50 men an attack of 450 savages. In recognition of services rendered, the United States government gave him a

tract of land (1799) on the Missouri R. See *Daniel Boone*, by Thwaites (1902).

Boonton, tn. and summer resort, Morris co., New Jersey, U.S.A., 14 m. w. of Paterson; has iron foundries, and manufactures flour, rubber, and agricultural implements. Pop. 5,000.

Boonville, city, Missouri, U.S.A., the co. seat of Cooper co., on the Missouri, 140 m. w. of St. Louis; manufactures boots and shoes, leather, bricks, and flour. Pop. 4,400.

Boorde, or BORDE, ANDREW (?1490-1549), English traveller and physician, was born in Sussex. He joined the Carthusians, and about 1521 was made suffragan bishop of Chichester. About 1528 he obtained dispensation from his vow. He made at least four tours on the Continent, one being to report on the state of feeling about Henry VIII. Principal works: *Dyetary* (1542), the *Breviary of Health* (1547), and the *Fyrst Boke of the Introduction of Knowledge* (1547). His *Boke of Berdas* (beards) and his *Itinerary of Europe* are lost. See 'Extra Series,' Early English Text Society (1870).

Boos, MARTIN (1762-1825), German theologian, born at Huttenried, in Bavaria, originated a Catholic pietist movement. In 1806 he settled at Hallmoukirchen, near Linz, whence his views spread rapidly. He held a professorship at Düsseldorf from 1817 to 1819. See his *Selbstbiographie* (1826; new ed. 1888), and *Life* by C. Bridges (1836).

Booster, a form of dynamo for raising the voltage of an outgoing current to compensate for the drop in a long feeder. See ELECTRICITY, DISTRIBUTION OF.

Boot, TORTURE OF THE. The boot, used to extort confessions in Scottish judicial proceedings, was an iron or wooden frame in which the leg was enclosed. Wedges were driven between boot and

leg with a mallet until the prisoner confessed, or was physically incapable of bearing further torture. It seems to have been in frequent use towards the end of the 16th century, but was discontinued in 1690, though not forbidden by law until 1709. See R. H. Story's *Life of William Carstares* (1874), *passim*, and Wodrow's *History of the Sufferings of the Church of Scotland* (1830), *passim*.

Bootan. See BHUTAN.

Boötes, an ancient constellation, supposed to represent the driver of the Wain, and sometimes called Arctophylax, the 'bear-keeper.' 'Late-setting Boötes' is among the star-groups mentioned in the *Odyssey* (v. 272), and Claudian (*De Raptu Proserpine*, ii. 190) speaks of 'piger Boötes,' in allusion to the upright position upon the horizon by which its setting is protracted. The principal star is Arcturus. *Miræ* (= ϵ Boötes) is one of the most beautiful double stars in the northern heavens, the components being respectively orange and green. Küstner finds that the radial velocity of the larger star is variable, indicating that it is a spectroscopic binary. Other binaries are ξ and μ^2 , revolving in periods of 148 and 276 years, while ι , κ , π , ζ , and 44 are more slowly moving couples.

Booth, BARTON (1681-1730), English actor, was born in Lancashire. He first appeared on the stage in London as Maximus in Fletcher's *Valentinian* (1700). Among his best representations were Hamlet, Othello, and Brutus; but it was as Cato, in Addison's play of that name, that he gained his greatest fame (1713). He wrote a drama, *The Death of Dido* (1716). See Cibber's *Life* (1753), and *Life* by Victor (1733).

Booth, CHARLES (1840), sociologist, was born at Liverpool,

and since 1862 has been a partner in the shipping firm of A. Booth and Co., Liverpool. He has devoted his life to the preparation of works of quite unique value on social questions, notably *Life and Labour of the People in London* (16 vols. 1889-1903), a very able work, full of carefully collected facts; *Pauperism, and the Endowment of Old Age* (1892); *The Aged Poor* (1894); and *Old Age Pensions* (1899). Mr. Booth served on Mr. Chamberlain's Tariff Reform Commission of 1903-4. He was made a P.C. in 1904.

Booth, EDWIN THOMAS (1833-93), American actor, son of Junius Brutus Booth, was born at Bellair, Maryland. One of the greatest of American tragedians, he excelled in Shakespearian tragedy (Hamlet, Lear, Othello) and as Richelieu. He went on the stage with his father in 1849, acted in California (1852-6), and travelled over America, Australia, and England (1861). Ruined (1874) by the expense of a palatial theatre in New York, he recouped his fortunes by a successful tour through the western states. His visit to Britain and Germany (1880-2) was an unqualified triumph. He died at New York. See Winter's *Life and Art of Edwin T. Booth* (1893), and E. B. Grossman's *E. Booth* (1894).

Booth, JOHN WILKES (1839-65), American actor, brother of Edwin Thomas Booth. He joined the forces of the South in the civil war, and on the defeat of the South he assassinated President Lincoln in Ford's Theatre at Washington, April 14, 1865. He was pursued to Virginia, and was shot on his refusal to surrender.

Booth, JUNIUS BRUTUS (1796-1852), Anglo-American tragedian, was born in London. He went on the stage in 1813, and achieved his first success at Covent Garden in *Richard III.* He left Britain

for the United States at the age of twenty-five. There he became the leading actor, his principal rôles being Hamlet, Richard III., Sir Giles Overreach (in Massinger's *New Way to Pay Old Debts*), Shylock, Lear, and Iago. See A. B. Clarke's *The Elder and the Younger Booth* (1882).

Booth, WILLIAM (1829), 'general' of the Salvation Army, born and educated at Nottingham, England, became a minister of the Methodist New Connexion (1850-61), and entered on evangelistic work in the east of London in 1856. General Booth has published numerous books and pamphlets, the best known of which is *In Darkest England and the Way Out* (1890). See Booth-Tucker's *Life of General W. Booth* (1898), and SALVATION ARMY.

Boothby, GUY NEWELL (1867-1905), sensational novelist, was born at Adelaide, Australia, which continent he crossed (1891) from north to south. Among his novels are *A Bid for Fortune* (1895), *The Beautiful White Devil* (1896), *Dr. Nikola* (1896), *Pharos the Egyptian* (1899), *Dr. Nikola's Farewell* (1901), *In Spite of the Czar* (1904), *For Love of Her* (1905), *A Crime of the Unlucky Seas* (1905), and *A Royal Affair* (1906).

Boothia Felix (so named after Sir Felix Booth), peninsula, the most northerly part of the mainland of N. America. Sir James Clark Ross, in 1829, fixed the position of the N. magnetic pole on this peninsula, 70° 5' N. and 96° 44' W. See Ross's *Narrative of a Second Voyage* (1860).

Boothia Gulf, N. Canada, separates Bothia Felix from Cockburn Is. It is about 300 m. long and from 60 to 100 m. broad.

Booth Line of steamships was founded at Liverpool, England, in 1866; at first carried passengers and cargo between Europe (Liverpool, Havre, Lisbon, Oporto) and the Amazon ports of Brazil.

rv.

In 1882 it began also to run vessels between New York and the Brazilian ports. In 1901 this line amalgamated with the Red Cross Line (founded 1869); it also manages the Iquitos Steamship Company, plying 2,100 m. up the Amazon. The total tonnage of all the companies is 106,900, divided among thirty-eight vessels. The company carries the royal mails to N. Brazil (Amazon). Four large ships of 18,700 tons are in course of construction for the fleet. London Offices: 11 Adelphi Terrace, W.C.

Bootle, comprising tnshtps. of Bootle-cum-Linacre and Orrell, munic. bor. (1868), and co. bor., Lancashire, England, included in Bootle parl. div. of Lancashire; continuous with Liverpool; has extensive jute factories, engineering works, timber yards, tanneries, and corn mills. The docks, which comprise some of the finest on the Mersey, belong to the port of Liverpool. Pop. 70,000.

Boot Manufacture. Until the advent of the Blake sole-sewing machine in the early 'sixties boots and shoes were entirely 'made' by hand. By the expression 'made' is meant that the soles and heels were attached by hand labour, the ordinary sewing machine being used to stitch the lighter leathers of boot uppers together. Higher grade boots were all made hand sewn, the cheaper and heavier goods being hand pegged or riveted. The Blake machine revolutionized the trade, and the Blake process rapidly became the popular method of manufacture for the cheaper grades. The more recent invention of welting machinery has again greatly modified the processes of manufacture, creating this time a close rival to the hand-sewn boot, similar in its essential construction and advantages. The Blake and riveted boot is made by one sewing or

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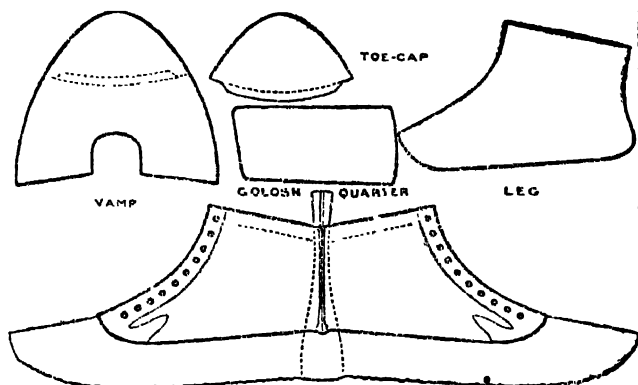
riveting right through from sole to insole, the upper being caught in between; while the hand and machine welted boot is first sewn half through the insole with a horizontal seam, which holds the upper, insole, and welt together, and then a second sewing attaches the welt and sole together. In the Blake boot the vertical seam, by resisting the bend of the foot, tends to stiffen the boot; while in the welted boot the horizontal seam, bending inwards, yields easily, and makes a more pliable article. This stiffness in Blake boots disappears in light goods where only light and flexible leather is used. The riveted boot, requiring a strong heavy insole to hold nails, screws, or clench-wires, is a stiff boot, and therefore this cheaper method of making is confined to grades of work suitable for rougher wear.

In a modern boot factory machinery has all but eliminated what was known as hand labour. The first process is cutting the leathers for the uppers, and this is done by men laying the skin over a bench, placing the pattern upon it, and 'clicking' (this word is derived from the sound) out the piece of leather, which is cut clean and close to the metal or brass-bound cardboard pattern. This department is almost entirely worked by hand labour. The various component parts having been cut are passed, in dozen pair lots or more, into the machine room to be stitched together. This department is usually staffed by women. The first machine employed is one with a rapidly revolving circular knife for skiving the edges of the leathers that have to be seamed or folded, after which the parts are pasted together and passed to the machines to be stitched, and finally hammered off under a little power-hammer to level the seams. In this de-

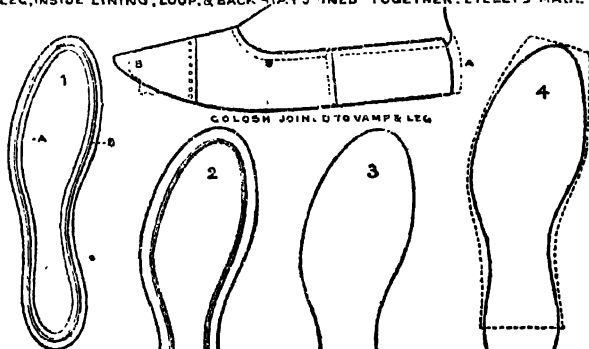
partment a great variety of sewing and other special machines are employed—single and twin-needle sewing machines, several currying knives for trimming off the edges of the leather, stitching, button-holing, barring, binding, edge-folding, and button-attaching machines, etc. Here, also, the eyelets are put in by a machine that punches a hole, feeds in the eyelet, and clenches it all at one stroke.

The completed upper is now passed to the bottoming department, the first section of which is usually styled the assembling room. In it the uppers and lasts and the component parts of the bottom—soles, insoles, etc.—are assembled together. These bottom parts are cut in the rough-stuff department from butts, bends, shoulders, and bellies, under powerful eccentric presses, with dies shaped to the various lasts and parts required. The soles and insoles are levelled; the stiffeners are skived and moulded to fit round the seat of the last; the heels are built with 'lifts' in shaped moulds in a machine which nails them loosely together, and then they are crushed in a machine which brings a pressure of several tons to bear on them, and so makes them into a solid heel. These parts are then sent to the assembling room to join the uppers.

The uppers, lasts, and bottom parts are now started through the making and finishing rooms, those to be made welted receiving slightly different treatment from those to be made Blake sewn. The stiffener (or counter) is placed on the upper, which is drawn over the last, to which the insole has previously been attached, and temporarily tacked in position, and sent to the lasting machine, which forces or moulds the upper into the shape of the last, twisting it in with



LEG, INSIDE LINING, LOOP, & BACK STAY JOINED TOGETHER. EYELETS MADE



INNER SOLE, SHOWING
LEATHER CUT & RAISED
TO FORM CHANNEL &
FEATHER B

WELT
SEWN TO
CHANNEL &
FEATHER

MIDDLE SOLE
OF CORN, LEATHER, ETC.

BOTTOM SOLE



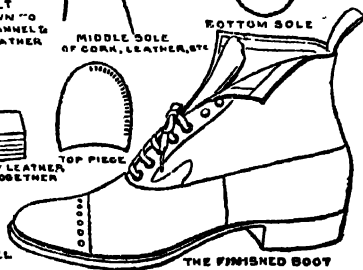
NAILS FORCED INTO
HEEL PLACED IN MOULD



LAYERS OF LEATHER
PASTED TOGETHER



TOP PIECE



THE FINISHED BOOT

The Manufacture of a Boot.

pinchers, and driving in tacks to hold it, just as a man would do by hand. For the Blake process the lasting machine permanently tacks the upper down to the insole with short tacks that are clenched on the inside by coming in contact with the Blake last, which is iron or iron plated on the bottom. The Blake boot is now ready for receiving the sole, which is channelled for the thread to lie in, placed in position, and the last having been pulled out, is sewn through with the Blake machine. After this it receives similar treatment to the welted boot. The difference in the welted boot begins with the lasting, the upper not being nailed flat down to the insole, but brought up against a lip previously cut in the insole. It stands out with this lip vertically from the insole, the tacks only holding it temporarily. The boot is now welted, the machine sewing through the lip and upper with a curved needle, and through the welt, which the machine holds in position, binding the three together, all this being done on the outside, the last still remaining in the boot. The boot being now welted, the seam, as it is called, is trimmed level, the welt beaten out straight, and the bottom packed level with felt or other material. The sole is now laid on, and held in position with nails, paste, or rubber solution until stitched. After this it is passed to the levelling machine, which rolls down the sole with considerable pressure, levelling it and moulding it into the waist of the last. The boot is now ready for heeling. This is done on a machine that nails the previously built heel on at one stroke. Blake boots, especially lighter ones, have the nails driven from the inside through to the heel; while machine welted boots are more usually attached from the

outside, the nails being driven through the heel to the sole. Another machine drives slugs round the wearing part of the top-piece, making its own slugs from a continuous wire, and driving them home so rapidly that the operation cannot be followed by the eye.

The boot is now technically 'made,' and is passed to the finishing room. The first operation here is cutting down the breast of the heel with a guillotine knife regulated to reach the sole but not mark it. The second operation is trimming the heel to the desired shape, which is done by revolving knives running at a very high speed. The heel is afterwards smoothed with sandpaper. A similar operation trims the edge of the sole smooth, and then the sole-edge and heel are coloured and burnished with hot irons by machinery. An ingenious little machine makes the prick mark between the stitches on the welt, and then the boot is passed forward to have the bottoms buffed and coloured, after which the bottom is glossed up with revolving pads and brushes. This brings the process to an end.

A very flexible boot or shoe called 'turns' is made by sewing a sole to the upper inside out—the same process as welt sewing, but without the welt. When the shoe is turned it is ready for heeling, there being only the one sole. Evening dress shoes and extra light goods are made in this manner.

Booty. See *PRIZE*.

Bopp, FRANZ (1791-1867), German philologist, was born at Mainz, and studied at Aschaffenburg under Windischmann. In 1812 he went to Paris, where he became intimate with Chézy, Silvestre de Sacy, Langlès, A. W. and Friedrich von Schlegel, and Alexander Hamilton. In his great work, *Ueber das Conjugations-*

system der Sanskritsprache, which appeared at Frankfurt-on-the-Main in 1816, he endeavoured to trace a common origin for the grammar of Sanskrit and the Aryan family of languages, and thus inaugurated a new era in linguistic study. He published (1819) an edition, with a Latin translation, of *Nala and Damayanti*, an episode in the *Mahābhārata*, and in 1821 was appointed professor of Oriental literature and philology at Berlin, and the following year was elected a member of the Royal Prussian Academy, and held both posts till his death. His principal works during these years were *Ausführliches Lehrgebäude der Sanskritsprache* (1828); *Vergleichende Grammatik des Sanskrit, Zend, Griechischen, Lateinischen, Litthauischen, Altslavischen, Gotischen, und Deutschen* (6 parts, 1833-52), trans. into English by E. B. Eastwick (1845-50); 3rd ed. 1862); and *Ueber die Keltischen Sprachen* (1839). He also published other selections from the *Mahābhārata* and several other books. See Lefmann's *Franz Bopp* (1891-7), and Th. Benfey's *Geschichte der Sprachwissenschaft* (1869).

Boppard (anc. *Rodobriga*), town, Rhineland prov., Prussia, on l. bk. of the Rhine, 10 m. s. of Koblenz. Fruit and wine are produced. Pop. 6,600.

Bora, the sharp, cold, dry north-east wind blowing in fierce gusts (with a velocity running up to 130 m. an hour) off the Karst and Illyrian Mts. along the coast of Dalmatia, from Albania in the south as far north as Trieste. It is due to the great and sudden increase in the barometric pressure in winter over the high plateaus of Central Europe, and to the rapid descent of heavy cold air into the valleys and over the Adriatic Sea. It sometimes blows for days and even weeks together. It is also known along

the north-east coast of the Black Sea.

Bora, BOHRA, or BOHREN, KATHARINA VON (1499-1552), wife of Luther. The daughter of a German squire, she entered a convent at Nimbschen, near Grimma, Saxony, while a young girl, and, after a perusal of Luther's works, decided, with eight of her companions, to embrace the principles of the Reformation. With the assistance of the reformer, the nuns made their escape from the convent (1523), and Katharina was placed under the care of the burgomaster of Wittenberg until her marriage with Luther two years later. Their early married life was full of adversity and poverty, but Katharina was a true helpmate. She survived her husband seven years, and died at Torgau, whither she fled from her home at Wittenberg to escape the plague. See *Life* by A. Thoma (1900).

Bora-Bora, or BOLABOLA, one of the Society Is., N.W. of Tahiti, 30 m. in circumference; discovered by Cook in 1769.

Boracic, or BORIC, ACID (H_3BO_3) occurs as such in volcanic districts, particularly in the Tuscan lagoons of Italy. In combination with metals it is found as borax or tincal, boracite, boronatrocalcite, etc. It is prepared either by evaporating the water which contains it through the natural heat of the *soffioni*, or steam jets that escape from the earth, and crystallizing the product, or by the action of sulphuric acid on borax. Boric acid forms colourless pearly crystals, which are somewhat soluble in water, forming a weak acid from which a series of salts—the borates—are derived. Borax is the most important of these. Boric acid colours an alcohol flame green, and is used for the preparation of borax, as a glaze for earthenware, and as a mild antiseptic and food preservative.

The last application is open to criticism, as the continued use of boric acid is considered by some to be hurtful, though probably, in the small amounts allowable, not to a serious extent. As an antiseptic it is useful, on account of its mild, local, and non-irritant character, in preparing dressings; and as a lotion, for use in minor surgical operations, burns, etc. It also relieves the itching which accompanies rashes.

Borage. The common borage (*Borago officinalis*) used to be highly esteemed for its effect in cheering the spirits of the depressed. The young leaves are now chiefly employed as a flavouring in the preparation of claret-cup, and in Germany as a flavouring in salad. The plant is an annual, and quickly becomes a weed in the garden through its rapid growth. The whole plant is strikingly hairy, and its drooping flowers are of the purest blue. The average height of the common borage is about eighteen inches. Other very vigorous species are *B. orientalis*, the Cretan borage, a spring-flowering perennial, rather coarse in general aspect, though bearing flowers of much beauty; *B. laxiflora*, a Corsican species, also a perennial, blooming through the summer months; and the long-leaved borage, *B. longifolia*. All these species bear flowers with blue corollas, though of the common borage there is a white variety.

Borås, tn., prov. Elfsborg, Sweden, on Wiska R., 36 m. E. of Gothenburg. Its inhabitants are engaged in cotton spinning and weaving. Pop. 17,000.

Borax, a borate of sodium having the formula $\text{Na}_2\text{B}_4\text{O}_7 + 10\text{H}_2\text{O}$. It occurs native in Tibet and California (that from the former locality being known as tincal), but is chiefly prepared by neutralizing Tuscan boric acid with sodium carbonate and crystalliz-

ing the product. It is a crystalline colourless solid, soluble in water, and intumesces when heated, afterwards melting to a glassy liquid, which is useful in brazing and silver-soldering, as it dissolves metallic oxides, thus cleaning the surfaces of the metals to be united. As the solutions of the different metallic oxides in fused borax have characteristic colours, the 'borax bead' is usefully employed as a chemical test. It is also used as an antiseptic and food preservative; in making glazes for metals and earthenware; and as a laundry glaze.

Borbeck, comm. of several villages, prov. Rhineland, Prussia, 3 m. N.W. of Essen, with coal mines, iron and zinc works, etc. Pop. 60,000.

Borchgrevink, CARSTEN EGBERG (1864), born at Christiania; emigrated to Australia; sailed on the *Antarctic* from Melbourne (1894), and was one of the first party to land on the Antarctic continent (Jan. 23, 1895). In August 1898 he commanded the Southern Cross expedition organized by Sir George Newnes. He made investigations into volcanic disturbances in the W. Indies (1902). See his account of his first Antarctic voyage in the *Report of Sixth International Geographical Congress, London* (1895), and his *First on the Antarctic Continent* (1901), and *Das Festland am Sydpol* (1904).

Borda, JEAN CHARLES DE (1733-99), French mathematician, astronomer, and naval designer; visited America and the west coast of Africa to test marine chronometers (1771-6); took part in the American war (1777-8), and was captured and released (1782) on parole by the British; served later in the French naval department; was engaged in the measurements preliminary to the introduction of the metric system of weights and measures; made important

investigations into the pendulum (1790); and was member of a commission for the measurement of a meridional degree. He wrote *Description et Usage du Cercle à Réflexion* (1778; later ed. 1816) and other works.

Bordeaux, tn. on l. bk. of Garonne, dep. Gironde, France, 60 m. from the sea, and 359 m. by rail s.s.w. of Paris. It is the seat of an archbishop, and the headquarters of the 18th Army Corps. Besides a university (1441), the city has a school for hydrography and navigation (1631), an observatory, a library, and a museum. Bordeaux is the third seaport of France; its harbour has always a depth of 20 ft. of water, and at high tide ocean-going steamers can ascend to the city. Statues of Montaigne (mayor 1581-4) and of Montesquieu adorn the Place des Quinconces. Among the buildings of interest are the Roman amphitheatre, the church of St. Croix, the old cathedral of St. Seurin (11th-15th century), and the Gothic cathedral of St. André (13th-15th century). The French government, on the representations of foreign powers, removed to Bordeaux from Tours, Dec. 11, 1870. By the 'Pacte de Bordeaux,' M. Thiers became chief of the executive, Feb. 17, 1871. The wines of Bordeaux, famed since the 4th century, are of the first importance. The manufactures of chocolate, sugar, flour, beer, tobacco, glass, and pig-iron, are among the chief industries. Chief exports: wines (about 18,000,000 gallons annually), spirits, fish, dried table fruits, pit-wood, chemicals, and resin. Chief imports: wines (chiefly from Spain and Algiers), salt fish, timber, spirits, coal, chemicals, pottery, and machinery. The value of exports is about £15,000,000, and of imports £12,000,000 per annum. Here were born Richard II. of Eng-

land (1366), Magendie (1783), Joseph Black (1728), Rosa Bonheur (1822), and Desèze (1748). Under the name of Burdigala, Bordeaux was the capital of Aquitania Secunda in Roman times. After devastation by Vandals, Visigoths, Franks, and Normans, it enjoyed a period of peace (1152-1153) under English protection, and passed to Henry Plantagenet on his marriage with Eleanor of Guienne. Pop. 252,000. See Julian's *Histoire de Bordeaux depuis les Origines jusqu'en* 1895 (1895).

Bordeaux Wines. See CLARET. **Borden**, SIR FREDERICK WILLIAM (1847), Canadian statesman, was educated in Harvard Medical School, Boston, Mass., and began to practice in Nova Scotia in 1868; has sat in the Canadian House of Commons since 1874, except for the short period 1883-6; minister of militia and defence since 1896. He was made K.C.M.G. in 1902.

Borden, ROBERT LAIRD (1854), Canadian Conservative leader, born at Grand Pré, Nova Scotia; was called to the bar of Nova Scotia. Elected to the Dominion House for Halifax in 1896, he was chosen to succeed Sir Charles Tupper as Conservative leader in opposition (1900). Defeated at Halifax in the general election of 1904, he sat for the county of Carleton, Ontario (1905); member for the city and county of Halifax (1908). In matters of Canadian policy Mr. Borden advocates a vigorous transportation scheme, and, while protectionist in principle, opposes bounties; in matters of imperial policy he supports Mr. Chamberlain's preferential programme. He has strongly opposed the Reciprocity Treaty with the U.S.A.

Bordentown, city, Burlington co., New Jersey, U.S.A., on the Delaware, 28 m. N.E. of Philadelphia; has iron foundries and ma-

chine shops, and a military institute. Joseph Bonaparte, brother of Napoleon I., lived here (1817-32 and 1837-9). Pop. 4,000.

Bordereau, French word meaning invoice, account, or memorandum. It came into prominence in connection with the Dreyfus affair in 1894. The particular bordereau referred to was a letter said to be in Dreyfus's handwriting, addressed to the military attaché of the German Embassy, and revealing military secrets regarding frontier forts, artillery instructions to the general staff, etc. Upon this bordereau Dreyfus was condemned. Subsequently its authorship was traced to Count Esterhazy, who afterwards made a confession in the *Daily Chronicle* of June 2, 1899. See DREYFUS AFFAIR.

Borders, **THE**, is the name associated in history, poetry, and literature with the district lying on either side of the Cheviot Hills, which form in great part the dividing line between England and Scotland. The scenery is somewhat monotonous, with its smooth, grass-covered, gently undulating hills, wild moorland, marsh, clear streams, and cultivated valleys; towards the west the hills are more rugged.

Evidences of the ancient inhabitants are found in numerous cists, cairns, standing stones, and cromlechs, and in hill forts, rings, moot-hills, and cave dwellings. Before the Roman occupation, and for centuries afterwards, the land was occupied by a Cymric people, who, after a long struggle with the invading Picts, Angles, and Scots, were gradually driven west to the mountains of Strathclyde, and the district was occupied by Anglo-Saxon and Norse invaders. It formed (from the 7th century) part of the kingdom of Northumbria, which, in the 10th century, was brought under the English crown. Mal-

colm II. of Scotland, after his victory over the forces of Northumbria at Carham (1018), incorporated that portion of Northumbria lying between the Forth and the Cheviots into the Scottish kingdom. From that time down to the reign of David I. (1124-53) many of the Saxon nobles and landowners who had resisted William the Conqueror, and later, several of the Norman barons, emigrated into Scotland. The Celtic names gave place to Saxon and Norman, and the language of the south and east of Scotland and of the Northumbrian border became a fusion of Anglo-Saxon, Danish, and Norse. The country has a place in Arthurian legend, and is claimed as the site of some of Arthur's battles with the Picts and Scots; he is traditionally said to be sleeping with his knights in a cavern under the triple Eildon Hills, awaiting the bugle sound which shall recall him, sword in hand, to victory. From the close of the 12th century the border line has been much the same as now. During the reign of David I. the great abbeys of Jedburgh, Melrose, Kelso, and Dryburgh were founded, and richly endowed by him. The peaceful times (1214-49) of Alexander II. brought extended culture and commerce. Berwick became one of the greatest seaports in Britain, and Roxburgh and Jedburgh were then important towns. Family feuds and freebooting raids were frequent, and attempts were made to reserve peace and order by the issue of Border laws, whereby all disputes were decided by a commission of twelve English and twelve Scottish knights. Towards the close of the 13th century the Scottish campaigns of Edward I. provoked a state of perpetual warfare on the Borders, which continued with comparatively short intervals of peace down to the union of the crowns.

To check these feuds, the Borders were divided in the 14th century into East, Middle, and West Marches by the English and Scottish governments; and wardens, invested with arbitrary power, were appointed on both sides to keep order. Plundering raids were constantly made from one side or the other through the Cheviot passes and along the valleys of Jed, Teviot, Coquet, Rede and other streams, the details of which are immortalized in the romantic Border ballads. Within the last century the country has made great advances in agriculture, manufactures, and trade.

It is chiefly to its ballads, romantic literature, and poetry that the land owes its modern interest. Michael Scott, though said to have been born at Balwearie, Fife, is more closely associated with the Tweed valley, and is remembered popularly for those wizard deeds over which Sir Walter Scott has thrown the glamour of poetry.

The ballads and songs are true products of the people, who have always been marked by a genius for romantic poetry. The memory of fairyland and witchcraft remains in *The Young Tamlane* of Thomas of Erceildoune (Earlston), or Thomas the Rhymer, and Hogg's *The Queen's Wake* (1813), *The Wife of Usher's Well*, and *The Gay Gos Hawk*; the poetry of their history includes *Auld Maitland*, *The Battle of Otterburn*, *The Raid of the Redeswire*, *Jamie Telfer of the Fair Dodhead*, and *Kinmont Willie*. We have songs of pathos in *The Douglas Tragedy*, *The Dowie Dens of Yarrow*, *The Lament of the Border Widow*; and songs of love and emotion, as well as descriptive poetry, in *John Hay's Bonnie Lassie*, *Et trick's Banks*, *Lady Grisell Bailie's Werena my heart licht I wad dee*, and generally in the collections of Percy's *Reliques*,

IV.

David Hord's *Ancient and Modern Scottish Songs* (1776), Evans's *Old Ballads* (1784), Scott's *Minstrelsy of the Scottish Border* (new ed. 1902), Jamieson's *Popular Ballads and Songs* (1806), and the collections of David Laing, C. Kirkpatrick Sharpe, Allan Cunningham, Chambers, and Aytoun. Among the later poetry of the 18th and 19th centuries are James Thomson's *Seasons* (1726-30); Robert Crawford's *Tweed-side, Bush aboon Traquair, Leader Haughs and Yarrow*; Jean Elliot's version of the *Flowers of the Forest*, 'I've heard the liltin' at our yowe-milkin'; Mrs. Cockburn's version of the same, 'I've seen the smiling of Fortune beguiling'; Leyden's *Scenes of Infancy* (1803); Hogg's *Kilmenny*; Scott's *The Eve of St. John* (1800), *The Lay of the Last Minstrel* (1805), *Marmion* (1808); Wordsworth's *Yarrow Revisited*; Laidlaw's *Lucy's Flittin'*; Pringle's *Adieu to Terriodale*; Lady John Scott's *Bounds of Cheviot*; Allan Cunningham's *Rattlin', Roarin' Willie*; and many others.

In addition to the works mentioned above, see Skene's *Celtic Scotland* (1876-80); Rhys's *Celtic Britain* (1884); Ridpath's *Border Hist. of England and Scotland* (1776); Groome's *Short Hist. of the Borders* (1887); Scott's *Border Antig. of England and Scotland* (1814-17); Jeffrey's *Hist. and Antig. of Roxburghshire*, etc. (1857-64); Veitch's *Hist. and Poetry of the Scottish Border* (1893); Douglas's (*County Hist. of Scotland*) *Roxburgh, Selkirk, and Peebles Shires* (1898), which contains a very full bibliography; Murray's *Dialect of the Southern Counties of Scotland* (1873); Wilson's *Tales of the Borders*; Robson's *Border Ballads and Battlefields* (1897); Scott's *St. Roman's Well* (1824), *The Abbot* (1820), etc.; Hogg's *Songs and Ballads* (1801); Geikie's *Geological Scenery of*

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Scotland (1901); Crockett and Orrock's *In the Border Country* (1906); and Mrs. Lang's *A Land of Romance* (1910).

Border Town, centre of Satiara dist., Buckingham co., S. Australia, on the railway between Adelaide and Melbourne, 150 m. S.E. of Adelaide. Pop. (with dist.) 1,800.

Bordighera, tn. and winter resort, Italy prov. Porto Maurizio, on the W. Riviera, 24 m. by rail E. by N. of Nice; consists of the new town next the sea, and the sheltered old town on higher ground inland (winter mean temp. 52½° F.). The place is famous for its palms and flowers (anemones, roses, carnations, etc.). Pop. 4,600.

Bordj-bou-Arreidj, comm., Algeria, dep. of and 100 m. W. by S. of Constantine. Pop. 9,000 (Europeans, 1,200).

Bordj Menaiel, comm., Algeria, dep. of and about 50 m. E. of Algiers. Pop. 15,000; (Europeans, 1,000).

Bordone, PARIS (1500-71), Italian painter of the Venetian school, pupil of Titian, and imitator of Giorgione, is remarkable for his delicate flesh-tones and shot-coloured draperies. He succeeded Palma as the fashionable painter of Venice, and was invited (1538-40) to Paris to paint French court ladies. His chief work, *The Fisherman giving St. Mark's Ring to the Doge* (Venice Academy), is a fine pageant picture; his *Daphnis and Chloe* and *Portrait of a Lady* (probably the fair and evil Bianca Capella) are in the National Gallery; and the *Lady at her Toilet* is in Edinburgh. See Ruskin's *Guide to Academy of Fine Arts at Venice* (1877); Kugler's *Schools of Painting in Italy* (1851).

Bordure, or **BORDER**, in heraldry, an ordinary (though sometimes classed with the subordinates) which, as its name implies,

extends round the edge of the field, on the surface of which it encroaches one-fifth. It was originally used as a mark of 'difference'—i.e. to distinguish the arms of cadets from those of the main line of a house, a function which it still retains in Scottish heraldry—but it is now frequently borne as a charge. A *bordure composée* or *gobonated*—i.e. composed of two rows of cheeks—is, in Scotland, the most usual mark of illegitimacy. In impaling, the side of the bordure next the partition line is omitted; it is not carried round a 'chief,' but stops at its lower edge.

Bore. A tidal wave which, breaking in an estuary, rushes up the channel with great violence. As the forward parts of the wave advance less rapidly in shoaling water than the backward parts, a great accumulation is caused in front. Remarkable bores are to be observed in the Severn and some other rivers in England, in the Solway Firth, in the Ganges, Indus, and Brahmaputra, and especially in the Amazons, where the bore reaches a height of 12-16 ft., and in the bays at the head of the Bay of Fundy.

Bore. See **GLXS**.

Boreas, the north, or more strictly the north-north-east wind, the coldest in Greece; in ancient legend brother of Hesperus, Zephyrus, and Notus. He dwelt in Thrace. Boreas was worshipped at Athens. See Harrison and Verrall's *Mythology and Monuments of Ancient Attica* (1890).

Borecole. See **KALE**.

Borelli, GIOVANNI ALFONSO (1608-79), Italian physician and mathematician, born near Naples; appointed professor of mathematics at Pisa (1656), and in 1657 professor of medicine there. He was one of the first to describe the parabolic path of comets, and he endeavoured to explain

the motion of the satellites of Jupiter by the laws of attraction. He was also the founder of the iatromathematical school, which attempted to apply mathematics to medicine, as in his *De Motu Animalium* (1680-1), which contains also interesting speculations upon the flight of birds.

Borers, wood-boring beetles which feed upon wood, into which they burrow. The most familiar and destructive are the death-watch and the bark beetle.

Borgå, or **BORGO**, tn., prov. Nyland, Finland, Russia, on Gulf of Finland, near mouth of river Borgå. It is the seat of a Lutheran bishop, and has a fine cathedral. Timber and wood pulp are exported to the value of £150,000 per annum. Trades in furs, wool, and dairy produce. In 1809 the constitution of Finland was framed here. Pop. 4,700. In 1790 Gustavus III., having defeated a Russian fleet at Frederikshavn, disembarked his army in the Bay of Borgå, near St. Petersburg. On June 6, another Swedish squadron, under the Duke of Sudermania, was driven into Borgå by the Russians after a two days' fight, and both Gustavus and the duke were blockaded by Admirals Tchitchagoff and Kruse. On the night of July 3 the Swedes cut their way out, with the loss of about a third of their fleet.

Borger, tn., Drenthe prov., Netherlands, 10 m. E.S.E. of Assen. Pop. comm. 7,500.

Borgerhout, suburb of Antwerp, Belgium. Pop. 45,000.

Borgetto, tn., Sicily, prov. of and 15 m. W.S.W. of Palermo. Pop. 7,800.

Borghese, a powerful Italian family which had its origin in Siena. (1.) CAMILLO, born at Rome; created cardinal (1596), Pope Paul v. (1605-21); excommunicated the governing bodies of Venice, in which he was opposed by Father Paul (Pietro

Sarpi), historian of the Council of Trent; ordered Francesco Suarez to write *Defensio Catholicæ Fidei contra Anglicanæ Sectæ Errores* (1613), a work against the oath of allegiance required by James I. He did much to beautify Rome, and added largely to the Villa Borghese. (2.) PAULINE BORGHESA (1780-1825), sister of Napoleon I., after the death of her first husband, General Leclerc (1803), married CAMILLO FILIPPO LUDOVICO BORGHESI (1775-1832), who served (1796-1815) in the French army, and became (1805) prince of Guastalla. He sold to Napoleon the museum of the Borghese Villa; its treasures are now in the Louvre. After Napoleon's downfall he severed his connection with the Bonaparte family, separated from his wife, and died at Florence. (3.) FRANCESCO BORGHESI, PRINCE ALDOBRANDINI (1776-1839), brother of the preceding, married the Countess Alexandra de la Rochefoucauld, and by her had three sons, of whom CAMILLO (1816) became minister of war in the Papal States (1848).

Borghese, GIOVANNI VENTURA (1640-1708), Italian painter, native of Citta da Castello, pupil of Pietro da Cortona. He imitated Cortona's rapid, sunny, superficial style, assisted him at Rome, and afterwards completed his unfinished work. Chief works: *Annunciation* and *Madonna*, in St. Nicolo da Tolentino in his native town. See Burckhardt's *Cicerone or Art Guide to Painting in Italy* (new ed. 1879).

Borghese, IPPOLITO (fl. c 1620), Italian painter, born at Naples. His subjects were religious and historical, and his chief works are an *Assumption* (altar-piece) in San Lorenzo at Perugia (1620), and an *Assumption* in chapel of Monte di Pietà, Naples, smooth in execution and unattractive in colour, recalling Raphael and Del Sarto.

Borghese Villa, at Rome, until 1902 the summer residence of the Borghesi, situated just outside the Porta del Popolo, was built by Cardinal Scipio Caffarelli-Borghese at the beginning of the 17th century, after plans by Giovanni Vansanzio, and has a superb park of nearly 250 acres. It contained formerly a splendid collection of works of art, which was sold to Napoleon in 1806 by Prince Camillo Borghese, and of which nearly two hundred pieces went to the Louvre. In 1815 some of them were restored, and after 1820 a new collection of sculptures and pictures was formed. In 1902, the villa, with its picture gallery, and the park, with the buildings it contains, were sold to the Italian state for £260,000.

BORGHESE PALACE, in Rome, the town residence of the Borghesi, is situated in the square of the same name. This palace, known also as 'il Cembalo Borghese,' from its shape, was begun in 1590 from the plans of Martino Lunghi, and finished in 1607 by Flaminio Ponzio, when it was acquired by Camillo Borghese; it is one of the finest buildings in Rome. Besides the picture gallery, there was a collection of art treasures, which was disposed of by public auction in 1892, in consequence of the loss of his fortune by Prince Paolo Borghese (b. 1845). Pope Leo XIII. acquired for the Vatican the important family archives. The picture gallery still contains nearly six hundred paintings, many of first-rate importance, including a *Madonna* by Botticelli; another by Lorenzo di Credi; four paintings by Raphael, including the *Burial of Jesus*; two pictures by Michael Angelo; the celebrated *Sacred and Profane Love* by Titian; *Danaë* by Correggio; *Christ on the Cross*, and a portrait of *Maria de' Medici*, both by Van Dyck.

Borghesi, BARTOLOMMEO, COUNT (1781-1860), Italian archaeologist and numismatist, born at Savignano; catalogued the Vatican collection of coins. He resided at San Marino (1821-60). His collection of coins was the best in Italy, and his researches elucidated much of the sacerdotal, military, and political life of the ancient Romans. See his *Nuovi Frammenti dei Fusti Consolari Capitolini* (1818-20). His works were collected in ten volumes (1862-97).

Borghetto, tm., Italy, prov. of and 25 m. S.E. of Milan. Pop. 6,000.

Borghorst, vil., Prussian prov. of Westphalia, 15 m. N.W. of Munster, with cotton mills. Pop. 8,000.

Borgia, CESARE (1475-1597), was the second son of Rodrigo de Borja, a Spanish noble, who afterwards became (1492) Pope Alexander VI. Cesare was made archbishop of Valencia, and afterwards (1493) cardinal, by his father. The Borgias waged a war of extermination against the Orsini, Colonna, Savelli, and other baronial families of the Roman state, whose lands and castles they seized. In June 1497 his brother, Giovanni Borgia, Duke of Gandia, was murdered, and his body thrown into the Tiber—the crime being instigated, it was said (1498), by Cesare, though historically this has not been proved. Immediately after this Cesare threw off the priesthood and resigned his cardinalate. Proceeding on a diplomatic mission to France, he was made Duke of Valentia by Louis XII., and in May 1499 he married Charlotte, sister of Jean d'Albert, king of Navarre. With French assistance Cesare now assailed the towns of the Romagna, which refused to acknowledge the supremacy of the court of Rome. Entering Rome in triumph in February

1500, he was created Duke of the Romagna and gonfalonier of the Holy See. He next defeated the Sforzas and Malatestas, and caused the two princes of Faenza to be treacherously put to death. Unsuccessful in attacking Bologna and Florence, he accompanied the French army in the invasion of Naples, when the greatest atrocities and infamies were committed by the invaders. In 1502 Cesare took Urbino and Camerino, where he put to death the Varani, Orsini, and Vitelli. He had now become the terror of all Italy, and contemplated making himself king of the Romagna, the Marches, and Umbria. His father's death by poison in 1503, on which occasion his own life was also (probably) attempted, was the signal for a coalition of his enemies, and in 1504 Cesare's forces were defeated, and he was arrested by Pope Julius II., and eventually sent prisoner to Spain. Escaping in 1506, he volunteered in the army of the king of Navarre, and on May 12, 1507, he was killed by a musket shot at the siege of the small town of Viana, near the Ebro. Cesare Borgia was a man of ungovernable passions, and reckless of human life in the pursuit of his schemes. With a towering ambition he trampled on all laws, human and divine; yet he was an able administrator, and a patron of art, befriending Pinturicchio and Leonardo da Vinci. Machiavelli's *Il Principe* (1535) was modelled upon Cesare Borgia. His *Life* has been written in Italian by Tomasi (1655), in French by Yriarte (1889), in German by Schubert-Soldern (1902), and in Eng. trans. by Villari (1878-83).

Borgia, Lucrezia (1478 or 1480-1519), only sister of the preceding, was born at Rome. She married in 1493 Giovanni Sforza, lord of Pesaro; but her father, who had become Pope in 1492, annulled

this marriage, and gave her hand in 1498 to Alfonso, prince of Bisceglie, nephew of the king of Naples. Still ambitious for her future, her father and brother caused her second husband to be assassinated; and in 1501 Lucrezia married Alfonso d'Este, son of the Duke of Ferrara, whom he soon succeeded. She now appeared as the patroness of literature, and especially encouraged Bembo, who seems to have contracted a platonic passion for her. Though she was represented as the sharer with Cesare in all the crime, vice, and licentiousness of the time, nothing is alleged against her after she became Duchess of Ferrara. She died June 24, 1519, respected by the subjects whom she had governed wisely when her husband was away in the field. Victor Hugo made her the subject of a drama (1833), and Donizotti the central figure of an opera (1834). Her character has been defended by Roscoe in his *Life of Leo X.* (1805); by W. Gilbert, in *Life of Lucrezia Borgia* (1869); and by Gregorovius, in *Lucrezia Borgia* (1874; Eng. trans. 1904). See Corvo's *House of Borgia* (1901).

Borgne, a lake in S.E. Louisiana, U.S.A., 12 m. E. of New Orleans, in reality a shallow arm of the Gulf of Mexico.

Borgo. (1.) B. A MAZZANO, tn., Lucca prov., Italy, 20 m. N. by R. of Pisa. Pop. comm. 8,500. (2.) B. SAN DONATO, tn. and episc. see of prov. Parma, Italy, 14 m. by rail N.W. of Parma; has a fine Romanesque cathedral first built in the 4th century, but rebuilt in the 11th. It is identified with the ancient *Fidentia Julia*. Pop. 12,000. (3.) B. SAN LORENZO, tn., Italy, prov. of and 18 m. N.E. of Florence. Pop. comm. 15,000. (4.) B. SAN SEPOLCRO, or SAN SEPOLCRO, tn. and episc. see, prov. Arezzo, Italy, in the upper valley of the Tiber, 28 m. by rail N.E. of

Arezzo; is surrounded by walls, has a citadel and picture gallery and a fine cathedral, and was the birthplace of the painter Piero della Francesca (c. 1420). Pop. 9,000.

Borgognone, properly AMBROGIO DI STEFANO DA FOSSANO (?1445-1523), Italian painter, pupil of Foppa and a master of Bernardino Luini, is distinguished by great devotional feeling and tenderness, and has been called the Perugino and Fra Angelico of the Lombard school. He worked as architect and painter for the Certosa, Pavia. Among his chief pictures are his *Crucifixion* (1490, Pavia); an altar-piece, *St. Ambrogia* (Milan); an *Assumption* in the Brera in Milan; and in the National Gallery, London, a *Virgin and Child*, *The Two St. Cathelines*, *Triptych*, and two portrait groups. See Morelli's *Italian Masters in German Galleries* (1883).

Borgomanero, tn., prov. Novara, Italy, 19 m. by rail N.N.W. of Novara, with silk industries. Pop. 10,000.

Borgo Pass, in the Carpathians, is in the Hungarian co. of Bistritz-Naszód, and facilitates communication between Bukovina and Transylvania. It lies 3,940 ft. above sea-level.

Borgotaro, tn., Italy, prov. of and 30 m. S.W. of Parma. Pop. comm. 9,000.

Borgu, a w. prov. of N. Nigeria, Brit. W. Africa, lying between 9° and 11° 30' N. and 3° 30' and 4° 40' E. Pop. est. at 40,000. The native kingdom of Borgu or Bus-sango, about 30,000 sq. m. in area and inhabited by Fulbe and Yorubatribes, extends into French Dahomey.

Borgu, or BORKU, dist. of Africa in the Sahara, about 17°-20° N. lat. and 18-21° E. long.

Boric Acid. See BORACIC ACID.

Boring holes in wood is accomplished by means of awls, gimlets,

augers, or brace and bits. For making holes in metals rotary drills are used, either in the form of a hand implement or of a special machine driven by power, or in conjunction with a lathe. (See DRILLS.) Boring into the earth, in prospecting for minerals, is done by hand within limited depths. The surface soil is sunk through by a pit, within which the men work. On reaching the hard substratum, a chisel, screwed on to the end of a solid iron rod about one inch square, is driven down, raised slightly and turned, and driven down again by another blow. As the hole gets deeper a second rod, and then others, are screwed on. After a time the hole is choked, and then the sludger is sent down in place of the chisel. This is a tube with a valve at the bottom, of such a nature that it retains the debris, which is brought to the surface and examined. When the rods become too heavy for the men to lift, they are suspended from a 'spring pole' or larch tree 30 to 40 ft. long, fixed in the ground with its thin end inclined over the bore-hole; the pole is then started springing, and after each descent the rods are turned. Below depths of 100 yds. a steam-engine is used, the rods being suspended from one end of a beam, the other end of which is driven by the piston rod. In 'rope boring' a flat rope is substituted for the iron rods; this method is suitable for large bore-holes of 6 to 30 in. In America a round wire rope is used, and the boring tool often weighs over a ton; by this means as much as 200 ft. has been bored in twenty-four hours. The diamond boring machine, used for hard strata, grinds away an annular hole, leaving a central core which is afterwards extracted. Hollow steel rods are used, and diamonds are let in to the grinding face of the lowest. The rods

spin round at the rate of three hundred revolutions per minute, and water under pressure is forced down their interior. By this means 50 to 60 ft. may be bored per day in coal-measure rocks. The calyx drill is similar to the diamond, except that saw teeth of very hard steel are substituted for the diamonds. A type of core drill now much used is the shot drill. The boring head is a steel cylinder slotted at several points. Small chilled steel shot, poured down the hollow rods with the water, find their way through the slots, and get between the end of the head and the rock. The rolling action breaks up the rock. Progress is as rapid as with a diamond drill, but the cost of the chilled shot is only a small fraction of that of a single diamond. An ingenious method for surveying the inclination of bore-holes is effected by Mac-George's clinometer. It often happens that the course of the boring is deflected by a hard rock or by a highly-inclined stratum. When this is suspected, a number of glass tubes containing melted gelatin are sent down in a special case. At each end of the tube is a bulb, one containing a magnetic needle supported by a float, and the other a small plumb bob similarly supported. The gelatin sets; the apparatus is drawn up; and the angle of inclination, as well as its bearing, can be read off. For books on this subject, see MINING.

Boring Machines. See DRILLS.

Boris Godunov (1551-1605), Czar of Muscovy from 1598 to 1605, was of Tartar origin, and in his youth accompanied Ivan IV., the Terrible, in all his expeditions. Appointed by Ivan one of the council to assist his young son, Czar Theodore I. (1584-98)—who in 1580 married Boris's sister—Boris soon became the real ruler of the country. During this

time he made the Russian Church independent of the patriarch of Constantinople by creating the first Russian patriarchate at Moscow; he won the boyars or nobles by the famous ukase of 1597, by which he virtually converted the peasants into feudal serfs; he completed the conquest and fostered the colonization of Siberia, founding the town of Tobolsk and others; he secured the country against the invasion of the Tartars by fortifying Kursk and other places in the south. The Rurik dynasty becoming extinct through the death of Theodore in 1598, the boyars offered the throne to Boris Godunov. As Czar, Boris continued his reforms, and endeavoured to attract into the country foreign (Western) savants and artisans, and even planned to found a university at Moscow. But in the last year of his reign Russia was ravaged by famine and plague; also by civil war, for a pretender came forward to represent Demetrius, a second son of Ivan IV., whom Boris had put to death. In the midst of this crisis Boris suddenly died (Apr. 13, 1605). His life forms the subject of dramas by Pushkin (1831) and Count Alexis Tolstoy (d. 1876). See Brückner's *Die Europäische Russlands* (1888).

Borisoglebsk, tn., Tambov gov., Russia, 120 m. E.S.E. of Voronej, on the Orel-Tsaritsyn Ry.; important cattle fair in July. Pop. 25,000.

Borisov, tn., Minsk gov., Russia, on the Berezina, 50 m. by rail N.E. of Minsk; tanneries, breweries, tobacco manufactures. Pop. 15,000.

Borisovka, tn., Kursk gov., Russia, 85 m. S. of Kursk, on an affluent of the Dnieper. Pop. 16,000.

Borja, tn., Spain, prov. of and 36 m. W.N.W. of Saragossa; produces flax and hemp. Pop. (comm.) 5,700.

Börjesson, JOHAN (1790-1866), Swedish dramatist, first made himself famous as a lyric poet in the school of the Fosforists, but in 1820 ceased to write for twenty-five years, and then came forward as a dramatist with his *Erik XIV.* (1846), a fine poem, full of glowing colour, and with unusually strong characterization. Its successors, *Erik XIV.'s Son* (1847) and *Solen Sjuncker* (1856), did not justify the hopes of the public and the critics. He was chosen a member of the Academy in 1861. His lyrical powers are best exhibited in *Blommor och Tårar hå en Dotters Graf* (1854). See a selection from his works by Dietrichson (1873-4).

Borkum, one of the E. Frisian Islands, belonging to the Prussian prov. of Hanover, opposite the estuary of the Ems, 5 m. long by 2½ broad; is visited by some 17,000 persons every summer for sea-bathing. Borkum leapt into public importance in 1910, when it was the scene of a celebrated 'spy scare,' two English officers being sentenced to two years' imprisonment by the German government as spies. See *The Riddle of the Sands*, by Erskine Childers, which deals with the recent German naval activity on the North Sea coast. Pop. 2,000.

Borlase, WILLIAM (1695-1772), English antiquary and correspondent of Pope, was a native of Cornwall, and rector of Ludgvan, near Penzance, from 1722, and of Pendeon from 1732. His most important works were *Antiquities of Cornwall* (1753; 2nd ed. 1769), *Observations on the . . . Islands of Scilly* (1756), and *Natural History of Cornwall* (1758), all illustrated with plates after his own drawings. He presented the whole of his collections to the Ashmolean Museum, Oxford. See his autobiographical 'Memoirs' in Nichols's *Literary Anecdotes*, vol. v. (1812).

Bormann, EDWIN (1851), German humorous poet, has written in classic High German *Schwalbenbriefe* (1885; 19th ed. 1894), *Schwalbenpostkarten* (1885; 31st ed. 1897), *Die Tafelrunde* (1886; 14th ed. 1894), *Schatzkästlein* (1887; 10th ed. 1894), *Eilpost* (1887; 15th ed. 1897), etc.; and in the Leipzig dialect (Saxon), *Mei Leibzuy low' ich mir* (1881; 7th ed. 1898), *Leibz'ger Allerlei* (1884; 8th ed. 1895), *De Säck'sche Schweiz* (1890; 5th ed. 1895), *Das Buch vom Klapperstorch* (1892; 4th ed. 1896), *Säck'sche Allerweltspostkarten* (1892; 7th ed. 1898), *Gemeinliche Postkarten* (1897-8; 17th ed. 1898), *Gaudeamus Igitur* (1903), *Humoresken* (1904), etc. He has also contended energetically for the Baconian origin of Shakespeare's plays, in several books—e.g. *Das Shakespeare Geheimniss* (1894), etc.

Bormio, wat.-pl., prov. Sondrio, Italy, 35 m. N.E. of Sondrio, at the foot of the Stilfser Joch, and on the Adda; is famous for its hot mineral waters (salt and gypsum). Pop. 2,000.

Born, BERTRAN DE. See **BERTRAN DE BORN**.

Borna, tn., dist. Leipzig, Saxony, 17 m. by rail S.S.E. of Leipzig, with manufacture of felt shoes and pianofortes; iron foundries, gardening, and coal-mining. Pop. 9,000.

Börne, LUDWIG, whose original name was LOEB BARUCH (1786-1837), studied medicine and law. For some time (1811) he held the office of police actuary in his native town of Frankfort-on-the-Main, but in 1813 was dismissed, as being a Jew. In 1818 he became a Christian: it was a matter of conviction. From 1818-21 he edited *Die Wage*, a review which he had founded, and which made him known. In 1830 he was attracted by the revolution to Paris, where he and Heine became the leaders of 'Young Germany;' for

a little while they gave the most brilliant expression to the feverish unrest of the day. Börne's *Briefe aus Paris* (1832-8) reveal a visionary and impatient temperament, ultra-radical and bitterly satirical. His love for democracy amounted to a passion. His work, however, like that of Heine (with whom he was soon at bitter enmity), is fragmentary and negative. In addition to the *Briefe* he wrote some inferior verse; in 1837 appeared his *Menzel der Franzosenfresser*, and in 1861 *Briefe des jungen Börne an Henriette Herz* (1802-7), perhaps his most eloquent work. His *Gesammelte Schriften* appeared in 1829-34 (new ed. 1899). See Gutzkow's *Börne's Leben* (1840); Heine's *Ueber L. Börne* (1840); Gervinus's '*Ueber Börne's Briefe aus Paris*,' in *Historische Schriften* (1838); Brandes's *Das junge Deutschland* (1899); and J. Proelss's *Das junge Deutschland* (1892).

Borneo, isl., Malay Archipelago, after Australia and New Guinea the largest island on the globe. It is divided politically between the Netherlands and Great Britain, which has also protectorates over Brunei and Sarawak. Its length is about 690 m. by 605 m. in breadth, and its area a little over 300,000 sq. m.

The coasts, except in the N., are low-lying and irregular. A series of four mountain ranges, enclosing four tablelands of slight elevation, radiate N.N.E. and S.E. from a common centre in the S.W. The chief of these culminates in Mt. Kinabalu (13,698 ft.), in British N. Borneo. The other ranges have an extreme elevation of 6,000 ft. Coal is found, notably at Sarawak, Labuan, and Gaya. Gold is obtained in Dutch Borneo (annual value from £100,000 to £170,000); iron in S. Borneo; antimony and mercury in Sarawak, and W. of S. Borneo; other minerals are platinum, silver, tin, copper, zinc, lead,

and sulphur. There are also rich oil-wells. Diamonds and gems are obtained in W. and S. Borneo, notably at Landak.

Borneo is traversed by several large rivers, of which the most important are the Kapuas, the Kinabatangan, and Barito. They are mostly steep and torrential in their upper courses, but nearer the sea they overflow, and form wide, swampy marshes and lagoons (*dumans*). Of the interior little is known, except that it is covered with primeval forests yielding valuable timbers (teak, ebony, ironwood, sandalwood, etc.), gums and resins (india-rubber, gutta-percha, etc.), rattans, fibres, benzoin, spices (cloves, pepper, camphor, etc.), and magnificent flowers (orchids, pitcher plants, etc.). On the whole the surface is fertile, and produces abundance of food stuffs. The climate is hot and humid, the average temperature in S. Borneo being 82° F., and in N. Borneo 95° F.; the rainfall is heavy.

Trade in raw products (edible birds'-nests, etc.), and in manufactured wares, rice, and food stuffs, is carried on, principally with Batavia, Singapore, and Hong-kong, by Arabs, Chinese, Malays, and Europeans. Pop. over 2,000,000, including Dyaks (the aborigines), Malays, Buginese, Javanese, Arabs, and Chinese.

The European history of Borneo begins with its discovery by Lorenzo de Gomez in 1518, and the visit of the Magellan expedition in 1521. The Portuguese first opened up commerce, and were followed by the Spaniards. In 1608 the Dutch established a residency, and in 1706 the British a 'factory' at Banjarmasin. Early in the 18th century both nations abandoned Borneo, but in 1816 the Dutch returned; and in the 'forties the founding of the independent state of Sarawak by Rajah Brooke, and the ceding

of Labuan (1846) to Britain, re-established British influence. This has since been cemented by the establishment of the British North Borneo Company (1881), and the proclamation of Sarawak as a British protectorate.

BRITISH NORTH BORNEO has a coast-line of 900 miles, and an area of 31,000 square miles. Pop. 170,000. The capital is Elopura or Sandakan: pop. 10,000. It is administered by the British North Borneo Company, incorporated by royal charter, Nov. 1, 1881. The interior is very hilly and broken, but good land exists in the valleys. There are several fine harbours, the chief being Sibuku, Sandakan, Labuk, Darval, Ambong, and Gaya. The products are those of Borneo, as above, with the addition of petroleum. Tobacco and india-rubber are now important products. The exports are valued at £540,000, and the imports at £320,000 annually. From Brunei Bay, on the w. coast, a line of railway has been completed through the interior to Jesselton, on Gaya Bay (total length, 110 m.), and forms part of the proposed trans-Borneo line, which will terminate at Cowie harbour, on St. Lucia Bay, on e. coast of British N. Borneo.

DUTCH BORNEO is divided administratively into (1) W. Borneo (area, 55,825 sq. m.), pop. 450,000—chief tn. Pontianak; (2) E. and S. Borneo (area, 156,912 sq. m.), pop. (estimated) 785,000—chief tn. Banjarmasin. Within these are several native states, more or less subject to the Netherlands.

See Wallace's *Malay Archipelago* (new ed. 1906); Rajah Brooke's *Narrative of Events in Borneo* (1848); Whitehead's *Exploration of Mount Kina Balu* (1893); Burbridge's *Garden of the Sun* (1880); Bock's *Head-hunters of Borneo* (1882); Posewicz's *Borneo: Its Geology and Mineral Resources* (1892); *The Handbook of Brit.*

N. Borneo (periodical); Nieuwenhuis's *In Central Borneo*, in Dutch (1901); Roth's *The Natives of Sarawak and N. Borneo* (1896); Furness's *Home Life of Borneo Head-hunters* (1902); and Boccardi's *Wanderings in the Great Forests of Borneo* (1904).

Bornhem, tn., Belgium, prov. of and 12 m. s.w. of Antwerp; manufactures silk and cotton. Pop. 6,000.

Bornholm (abbreviated from *Borgundarholm*), a Danish island in the Baltic, about 25 m. from the s. point of Sweden. Area, 225 sq. m. Geologically it is the s.e. spur of the Scandinavian granite formation. It is well wooded, and has a rich vegetation, and yields kaolin and other fine clays, building stone, blue marble, and rock crystals. Cattle rearing, agriculture, and fishing are the chief industries. During the viking and early middle ages it was one of the principal trade centres in the Baltic, and indeed in the north. During the 16th century it was ravaged repeatedly by the Hanseatic League, and suffered greatly during its temporary domination by Lübeck (1525-75), and also under Swedish rule (1654-8). Since 1660 Bornholm has been incorporated with Denmark. Chief tn. Rönne. Pop. 40,000.

Bornu (57,000 sq. m.), country, formerly a negro kingdom, Sudan, Central Africa, lying w. and s. of Lake Chad. It was explored in 1822 by Denham and Clapperton. A large portion of it is of great fertility, especially the regions bordering the rivers Shari and Komadugu, feeders of Lake Chad. Dikoa, the capital since 1894, lies about 25 m. s. of the lake, in German territory. The former capital, Kuka or Kukawa, a most important trading centre, lies close to the w. shore of the lake. An earlier capital (15th century to 1809), Birnife, is much decayed.

Other towns are New Birnie, Ngornu, Mashena, Doloo, and Logone. The Kanuri race is predominant, the others being Tuaregs, Tibbus, Haussas, and Arabs. Mohammedanism is the adopted religion. Trade is done in cotton, indigo, ivory, ostrich feathers, skins, the Shea butter-nut, and leather. Chief productions are millet, barley, beans, ground-nuts, maize, cotton, and indigo. The mass of the people are negroes, who profess fetishism, and are divided into tribes speaking different idioms. Pop. (est.) 5,000,000. Bornu, formerly a part of the kingdom of Kanem, was founded as an independent state shortly after the middle of the 15th century, but declined again early in the 17th. This continued till the end of the 19th century, when its territories were appropriated by France, Great Britain, and Germany. The British portion now forms one of the fourteen provinces of N. Nigeria, and has an estimated pop. of 1,200,000. See Barth's (1857) and Nachtigal's (1879-89) *Travels*; also *Nigeria, Our Latest Protectorate* (1900), and other works cited under NIGERIA.

Boro-Budur, ruined Buddhist temple in Central Java, E. Indies; stands beside the Praga R., 15 m. N.W. of Jokjokarta. It consists of six square platforms superposed one upon another, and upon the topmost of them stands a lofty cupola, immediately surrounded by three concentric circles of bell-shaped cupolas. The bottom platform measures 500 ft. by 500 ft., and the total height is 118 ft. The edge of each of the platforms is protected by a balustrade of highly ornamental sculpture, and has midway an open-work cupola sheltering an image of Buddha. In addition to this there are a great number of smaller niches, each filled with a representation of Buddha, and a

series of over 2,000 bas-reliefs depicting various incidents in the history of the same divinity. See Leemans's *Bôrb-Bocdoer*, with nearly 400 plates (1873), Crawford in *Trans. of the Lit. Soc. of Bombay*, vol. ii. (1823), and Wallace's *Malay Archipelago* (1891).

Borodino, vil., Moscow gov., Russia, 72 m. W. of Moscow, on Kaluga R., trib. of Moskwa, celebrated for Napoleon's victory over the Russians under Kutusoff in 1812. In the battle the Russians lost 50,000, and the French 30,000.

Boron (B, 11), an element found in combination in boric acid, tincal or native borax, boracite, and other minerals. It is a dark-brown powder (sp. gr. 2.5), procured by heating boron trioxide (obtained by heating boric acid) with magnesium powder, and is of no commercial value. Several of its compounds, such as boracic acid and borax, are, however, used in medicine and the arts.

Bororos, a S. American people who occupy a vast domain of about 270,000 sq. m. in the Brazilian states of Matto Grosso and Goyaz. They were reduced about 1650 by the Portuguese. They are perhaps the tallest race in the world, averaging quite 6 ft. 4 in.—that is, more even than the Tehuelches (Patagonians), of whom they are regarded by some ethnologists as the parent stock.

Borosjeno, tn., Hungary, on the White Körös, co. of and 35 m. N.E. of Arad. Pop. 6,000.

Borough. See BURGH; LOCAL GOVERNMENT.

Borough, THE. See LONDON.

Boroughbridge, par. and mrkt. tn. on river Ure, 17 m. N.W. of York, in W. Riding of Yorkshire, England; scene of the defeat of the Barons, under Hereford and Lancaster, by Edward II., on Mar. 16, 1322. Pop. 800.

Borough Councils. See LOCAL GOVERNMENT.

Borough English is a custom still found with regard to certain lands, by which, on an intestacy, they descend to the youngest and not to the eldest son as heir. The custom is not affected by the Inheritance Act, 1833.

Borough Fund. In an English borough, under the Municipal Corporations Acts, the rents and profits of all corporate land, and the interest, dividends, and annual proceeds of all money, dues, chattels, and securities belonging to the corporation, the income from money arising from the sale of ecclesiastical patronage, and fines for offences against the acts not otherwise dealt with, go to the borough fund, and are to be expended on the purposes mentioned in the fifth schedule to the act. If the borough fund is insufficient to meet the expenditure of the borough, the council is authorized to meet the deficiency from the borough rate. See Arnold's *Municipal Corporations* (4th ed. 1894).

Borough Funds Act, 1872. This act enables municipal corporations and certain other local authorities in England to charge upon local funds and rates the cost of promoting and opposing private bills in Parliament. They may not promote a bill to compete with an existing gas or water company; and before incurring expense they must pass a resolution by an absolute majority at a special meeting, obtain the consent of the Local Government Board or a secretary of state, and observe other prescribed formalities.

Borough Sessions. See SESSIONS.

Borovichi, tn., Novgorod gov., Russia, nearly 200 m. S.E. of St. Petersburg, on Msta, affluent of Lake Ilmen. Commerce in leather, wood, and pottery; boat-building. Pop. 10,000.

Borovsk, tn., Kaluga gov., Russia, 53 m. N. of Kaluga city, on

sub-affluent of Volga. Grain trade. Pop. 9,000.

Borromeo Islands, four small islands in Lago Maggiore, Italy, opposite to Pallanza. Isola Bella ('Beautiful Isle') was in 1650-71 converted by Count Vitaliciano Borromeo and Cardinal Giberto, his brother, from a bare rock into a rich terraced garden, and crowned with a splendid specimen of an Italian 17th-century baronial palace. Isola Madre ('Mother Isle') has a botanical garden and an 'English park.' The other two islands are Pescatori (Fishers' or Upper Isle) and San Giovanni (St. John).

Borromeo, CARLO, COUNT (1538-84), cardinal and archbishop of Milan, was born at Arona, on Lago Maggiore. His uncle, Pope Pius IV., called him to Rome, and made him (1560) a cardinal and archbishop of Milan. He established an academy in the Vatican for the promotion of learning. When the Council of Trent terminated its labours in 1563, Borromeo was commissioned to draw up the famous exposition of Roman Catholic doctrines known as the *Catechismus Romanus*. Borromeo enforced much-needed reforms upon the clergy and the monastic orders, and himself set an example by his saintly and humble life and his benevolence to the poor. A monk of the order of the Umiliati attempted (1569) the cardinal's life. Borromeo visited all parts of his diocese, reforming abuses, and establishing colleges, schools, and asylums for destitute children. He founded (1570) the Helvetic College at Milan, and during the plague in that city in 1576 personally visited the sick and relieved the poor. It was through Borromeo that the Golden League—an alliance of the seven Catholic Swiss cantons—was founded for the united defence of the faith. Borromeo was canonized in 1610 by Pope

Paul v. The tercentenary of his canonization (1910) was made the occasion of a papal encyclical against Modernism. A colossal bronze statue was erected (1697) to his memory near his birthplace, on the west bank of Lago Maggiore. His *Works* were published in 1747, and his *Life* has been written by Giussano (Eng. trans. by Cardinal Manning, 1884) and Sylvain (1884).

Borromeo, FEDERICO, COUNT (1564-1631), nephew of the above, was made a cardinal in 1587. In 1595 he was consecrated archbishop of Milan, and, like his uncle, was distinguished for indefatigable zeal in his diocese, for wide charity, and enlightened piety. He was the munificent founder of the Ambrosian Library, for which he collected nine thousand MSS. He exhibited great personal devotion during the Milan famine and plague of 1627 and 1630. Manzoni has celebrated his memory in his famous novel *I Promessi Sposi* (1825-6).

Borron, ROBERT DE, a French *trouvère* of the latter part of the 12th century, born near Meaux; the author of a trilogy—*Joseph of Arimathea*, *Merlin*, and *Perceval*—dealing with Arthurian and Grail traditions. The work appears to have been written, about 1170-80, in metrical form, but the majority of the extant MSS. give a prose rendering. The *Perceval* is only represented by one MS., and is probably a working over, by a later hand, of the original romance. The *Grand S. Grail*, generally attributed to De Borron, is also, in all probability, the work of a later writer, though based upon the original *Joseph of Arimathea*. Borron is the first writer who gives the full Christian tradition of the Holy Grail, and of Joseph of Arimathea's mission to Europe. A relative of his, ELIE or HÉLIE DE BORRON, wrote *Palamedes*, *Melia-*

dus, and *Guiro le Courtois*, about 1200; and, previous to that date, rewrote the *Tristan* story, and welded together for the first time the *Morte d'Arthur*.

Borrow, GEORGE HENRY (1803-1881), English philologist, traveller, and author, was born at E. Dereham, Norfolk, of a family of Cornish yeomen. His father rose from the ranks to be captain and adjutant in the W. Norfolk Militia. His mother, Ann Parfremment, was of Huguenot (not, as is sometimes stated, of gypsy) blood. Borrow's life is sketched in a romantic spirit, with the suppression of real names and places, in *Lavengro* and *The Romany Rye*. His boyhood was spent wandering with the colours; and voluntary studies in French, Italian, and Spanish, as well as the lore of boxers, horse-coupers, and gypsies, supplemented a scanty education picked up at the High School, Edinburgh, the Norwich Grammar School, and elsewhere. From Norwich he ran away to be a footpad, and was flogged. In 1819 he was articled to a solicitor, but continued to study philology, and obtained some sort of acquaintance with about twenty tongues. His chief associates were John Thurtell, afterwards hanged for murder; and William Taylor of Norwich. He became subject to recurring fits of melancholy. Through Taylor he began to write for journals, and in 1824 went to London, where he supported himself by hack work. In 1825 came the famous ramble through England, and the visits to Stonehenge and the Mumpers' Dingle, near Willenhall, in Staffordshire, immortalized in *Lavengro*. Between 1826 and 1833 little is known of Borrow's life. He called this 'the veiled period,' and allowed it to be supposed that he was travelling, partly with gypsies, over Europe and Asia. Actually he seems, with the exception of a

journey (1826-7) through France and Spain, to have been working for booksellers in London and Norwich. So far his nearest approach to literature was in some translations from the Scandinavian. In 1832 he walked to London, in hope of employment from the British and Foreign Bible Society, and was sent by it to St. Petersburg (1833) to superintend the printing of the New Testament in Manchu. In 1835 he went as the society's agent and colporteur to Portugal and Spain, and at this work he spent five years, varied by at least two sojourns in Spanish prisons. In 1840 he married Mary Clarke, a widow with an income, and a cottage at Dulton, near Lowestoft. Here Borrow settled, and began the literary period of his career with *The Gypsies in Spain* (1841). This was followed by *The Bible in Spain* (1843); and then Borrow set to work on the autobiography, which was much delayed—*Lavengro* appearing in 1851, and *The Romany Rye* in 1857. Leisure made him restless, and his nervous troubles increased, so in 1844 he travelled through Europe as far as Constantinople. In 1853 he moved to Great Yarmouth, and began a series of peregrinations through the British Isles, one of which resulted in *Wild Wales* (1862). In 1860 he moved again to Brompton. In 1869 his wife died. Borrow himself was lost sight of, and believed by many to be dead, until he proved his existence by publishing his *Romano-Lavo-Lil* (Gypsy Word-Book) in 1874. In the same year he returned to Dulton, but spent much time in lodgings in Norwich, where he was a familiar figure until his death, in 1881. Borrow's philology was thoroughly superficial; but his vivid and adventurous imagination, his passion for 'the wind on the heath,' and his uncompromising and intolerant

Protestantism, give a unique fascination to the records of his journeyings. Works: New and in some cases enlarged editions of *The Bible in Spain* (1899), *Lavengro* (1900), *The Romany Rye* (1900), *The Gypsies in Spain* (1901), *Wild Wales* (1901). Biography: *Life, Writings, and Correspondence*, by W. I. Knapp (1899), with full bibliography; *George Borrow—the Man and his Work*, by R. A. J. Walling (1908); *George Borrow in E. Anglia*, by W. A. Dutt (1896); T. Watts-Dunton's papers in *The Athenaeum*, Sept. 1881.

Borrowdale, a picturesque valley, Cumberland, England, stretching from Glaramara Mt. along the river Derwent between the 'Jaws of Borrowdale' to the s end of Derwentwater. It contains the famous 'Bowder Stone.'

Borrowdale Volcanic Rocks, in the Lake District of Cumberland, are the rhyolitic and andesitic lavas and ash beds which were piled up round an old volcanic crater in Middle Ordovician times. The total thickness is estimated to be at least 12,000 ft. They rest upon the Skiddaw slates, and occupy an extensive area s. of Keswick and Buttermere, forming a range of mountains in which lie Lakes Thirlmere, Wast Water, and Ullswater. Helvellyn also consists of rocks of this group. See A. Sedgwick's *Geol. of the Lake Dist.* (in three letters addressed to Wordsworth, 1843); J. C. Ward's *Geol. of the Northern Part of the Lake Dist.* (1846); and Marr and Harker, *Proc. Geol. Ass.*, vol. xvi.

Borrowing. See LOAN.

Borrowstownness, or BO'NESS, par. (ac. 5,939) and seapt., bur. of barony and pol. bur. on s. shore of upper part of Firth of Forth, Linlithgowshire, Scotland, 3 m. N. of Linlithgow. It has coal mines (extending far below the firth) and iron works, brickfields

and potteries, distilleries, salt refineries, fishing and shipbuilding, and a considerable trade in pit props with Scandinavia and Finland. Remains of Antoninus's Wall, locally known as Graham's Dyke, are near. Pop. of tn. 10,000.

Borsa, vil., Hungary, co. of and 40 m. S.E. of Maramaros; has copper and lead mines and mineral springs. Pop. 8,000.

Borsig, JOHANN KARL FRIEDRICH AUGUST (1804-53), German manufacturer, founder (1837) of the engineering firm of Borsig at Berlin. In 1847-50 he built a large iron foundry at Moabit, near Berlin. His son ALBERT (1829-78) enlarged the firm by buying coal mines near Biskupitz in Silesia, and by erecting plant for the production of iron and steel (1862). See Vogt's *August Borsig* (1880).

Borsippa, or BIRS NIMRUD. See BABYLONIA.

Borsna, tn., Chernigov gov., Russia, 51 m. S.E. of Chernigov city, on a sub-affluent of the Dnieper, with tanneries and tobacco culture. Pop. 13,000.

Borstal System, began in 1902 with the collection at Borstal prison near Rochester of prisoners between 16 and 21, known as 'juvenile-adults,' who were under sentence of not less than twelve months. They were there subjected to a special set of rules, designed to encourage reformation, and on discharge were assisted to obtain employment by a philanthropic body called the Borstal Association. In 1903 the system was extended to Dartmoor. The Prevention of Crimes Act, 1908, provides for the establishment of special Borstal institutes for the industrial training and reclamation of juvenile-adult offenders, whom the court may in certain cases sentence to detention under penal discipline for not less than one nor more than three years. Such persons are kept under supervision for six

months after their discharge. The Treasury may contribute to the funds of societies such as the Borstal Association. See REFORMATORY.

Borszek, one of the most-frequented health resorts of Transylvania, Hungary, in a valley of the Carpathians, nearly 60 m. N.E. of Maros-Vásárhely. It has nearly a dozen springs, and the water is exported in considerable quantities. Pop. 1,700.

Borthwick Castle, Midlothian, Scotland, 13 m. S.E. of Edinburgh, built about 1430. In 1567 Queen Mary and Bothwell spent some days here, and from thence fled to Dunbar to escape the insurgent nobles. The castle capitulated to Cromwell in 1650.

Borwick, LEONARD (1868), English pianist, born at Walthamstow, Essex; studied at Frankfort Conservatorium, and under Schumann, Bernard Scholz, and Iwan Knorr. He made his debut at Frankfort (1889).

Bory de Saint Vincent, JEAN BAPTISTE GEORGES MARIE (1780-1846), French geographer and naturalist, was born at Agen; explored Bourbon, Réunion, and St. Helena (1798-1802); fought at Austerlitz, in Spain, and at Waterloo. After editing scientific and other journals in Belgium and France, he was appointed leader of a scientific expedition to Morea and the Greek islands in 1829, and president of the scientific commission for the exploration of Algeria in 1840. *Essai sur les Iles Fortunées* (1803), *Voyage dans les Quatre Principales Iles des Mers d'Afrique* (1804), *Expédition Scientifique de Morée* (1832), and *L'Homme, Essai Zoologique sur le Genre Humain* (1836) are his most important works.

Boryslaw, tn., Galicia, Austria, at the N. foot of the Carpathians, 6 m. S.W. of Drohobycz; a centre of the petroleum and ozocerite industries. Pop. 11,000, mostly Jews.

Borysthenes, the modern Dnieper. Near its mouth lay the town called by the same name, and also Olbia, Olbiopolis, and Miletopolis, which was a colony from Miletus, founded in the 6th century B.C., and the most important town on the N. of the Black Sea, especially for export of corn.

Borzhom, a much-frequented health resort in the Caucasus, Russia, in the ravine of the Kura, 80 m. W. by N. of Tiflis. The mineral springs have a temperature of 86° F. Alt. 2,600 ft. Mean ann. temp. 49° F.

Borzoi, THE, or RUSSIAN WOLFHOUND, a comparatively recent importation into England, the first specimens being a pair given by the Czar to King Edward VII. (then Prince of Wales) in 1870; but it was not until about twenty years later that the Duchess of Newcastle interested herself in the breed, and imported several specimens from Russia. In 1892 a team was sent from the Czar's kennels for exhibition in Britain. Several of them found their way into private kennels, and since then the popularity of the breed has greatly increased. In its native country the borzoi is hunted in couples, not in packs. Its quarry, the wolf, is driven out of cover into the open by other dogs, and allowed a good start. A brace of borzois are then slipped after it. They generally catch up the wolf in half a mile. On approaching, they separate and attack it from either side; and on getting a grip, they hold tenaciously until they are choked off by the huntsmen, who dispatch the wolf, for the borzoi itself rarely kills it. The points of the borzoi are: skull narrow-domed and long; jaws long and powerful; rather inclined to be Roman-nosed; expression soft, yet intelligent-looking; neck

long and slightly arched, and very powerful, well set on sloping shoulders; chest rather narrow, but extremely deep; back rising a little at the loins in a graceful curve, extremely muscular at the loins, but rather tucked up at this point in consequence of the great depth of chest and comparative shortness of back and ribs; fore legs set on well under the dog, and quite straight; feet well padded, and close at the toes; quarters very muscular and powerful, nicely bent on at the stifles, with hocks well let down; tail carried in a graceful curve, and rather low; coat profuse and silky; colour usually white, marked more or less with lemon, or tinted, but whole-coloured specimens are often seen. The average height of a borzoi dog ranges from thirty to thirty-three inches, and of a bitch from twenty-six to thirty inches.

Bos, a genus of mammals of which the domesticated oxen, *B. taurus* of Europe and *B. indicus* of India, are typical representatives. Linnaeus used the genus name to include oxen, bisons, and buffaloes, with their allies; some modern zoologists split up these into several genera, using *Bos* for the true oxen only. See CATTLE.

Bosa, seapt. tn. and episc. see, Italy, on the W. side of the island of Sardinia, 32 m. S. of Sassari. Pop. 7,000.

Bosboom, JAN (1817-91), Dutch painter of architecture, and a follower of Rembrandt and De Hooghe. He rendered the play of light in the interior of churches in a most delicate manner. His efforts prepared the ground for the younger modern school. See Muther's *Modern Painting in Europe* (1896).

Bosboom - Toussaint, ANNA LOUISA GERTRUIDA (1812-86), Dutch novelist, born at Alkmaar, and spent most of her life (1851-86) at the Hague; the

wife of the painter Jan Bosboom. She wrote principally historical novels, showing remarkable insight into human nature, combined with wide and accurate knowledge of the past. Good specimens of her work are *Het Huis Lauernesse* (1841; 10th ed. 1885), *Graaf van Deronschire* (1838), *Engelschen te Rome* (1840), *Leycester in Nederland* (1846), *Vrouwen van het Leycestersche Tijdperk* (1849), *Gideon Florenz* (1854)—all historical novels. Her social novels, as *De Delftsche Wonderdokter* (1871) and *Majoor Frans* (1875), are not so successful. Her collected novels appeared in 25 vols. (1880-8). There is a *Life* in Dutch by Jan ten Brink (1886).

Boscan-Almogaver, JUAN (c. 1495-1542), Spanish poet, served as a soldier in Italy until 1519, when he returned to Spain, and became tutor (1520-6) to the great Duke of Alva. He was induced by the Venetian ambassador Navagiero to adopt the Italian hendecasyllabic metre in 1526, and was mainly instrumental in changing the fashion of Spanish verse. For the rest of his life he closely imitated the verse forms of the Italian poets, especially Tasso. He also translated excellently Castiglione's *Cortegiano* (1534; new ed. 1873). Most of his poetic works were published after his death with those of his friend Garcilaso de la Vega (1st ed. Barcelona, 1543). A good edition of Boscan's alone (*Las Obras de Juan Boscan*), biography by Professor Knapp, appeared in Madrid in 1875.

Boscawen, SIR EDWARD (1711-61), British admiral, third son of the first Viscount Falmouth. In 1741, under Vernon, he distinguished himself at the taking of Porto Bello. In 1744, when in command of the *Dreadnought*, he assisted in the capture of the French ship *Médée*. In 1747, after commanding the *Namur* in the

action off Finisterre, where he was wounded, he became a rear-admiral. Having subsequently rendered useful service in India, he became a lord of the Admiralty in 1751, and a vice-admiral in 1755. He effected the reduction of Louisburg and Cape Breton Island in 1758, and in the following year chased and destroyed a French squadron under De la Clue off Lagos. In 1758 he reached the rank of admiral, and in 1760 was made general of marines. See Standing's 'Sir Edward Boscawen,' in *United Service Magazine*, vol. cxiii. (1900).

Bosch, JEROM. See AAKEN.

Bosch, JAN VAN DEN, COUNT (1780-1844), Dutch general and statesman, born in Gelderland. Entering the army, he went to Java in 1797, and rose rapidly to the position of governor-general of the Dutch East Indies in 1828. After crushing the native revolt led by Diponegoro, he administered the dependency with great energy, introducing the *Kultur* system, which subordinated all the native industries to the economic prosperity of the administration—i.e. of Holland. In 1833 he became colonial secretary of state at home, but resigned the post in 1839, and in 1842 was created a count.

Boscobel, par., Shropshire, England, 6 m. N.E. of Shifnal; contains the mansion-house in which Charles II. took refuge after his defeat at Worcester on Sept. 3, 1651.

Bosco Reale, and BOSCO TRECASE, two adjoining communes at the base of Mt. Vesuvius, 12 m. E.S.E. of Naples, Italy. Pop. Bosco Reale, 9,500; Bosco Tre-case, 10,000.

Boscovich, RUGGIERO GIUSEPPE (1711-87), mathematician and astronomer, was born at Ragusa, and entered the Jesuit order

in 1725. Appointed professor of mathematics and philosophy at the Roman College (c. 1740), he received the Pope's commission to measure a degree of the meridian in the Papal States, an account of which was published in 1755. After holding university appointments at Pavia and Milan, he was appointed director of optics to the French navy (1774-83). His chief works are *Elementa Universæ Mathematicæ* (3 vols. 1757), *Opera Perimentia ad Opticam et Astronomiam* (5 vols. 1785), and a long-winded Latin poem, *De Solis ac Lunæ Defectibus* (1764). He died insane. A *Life* in Croatian was published in 1888.

Boshof, dist. and tn., Orange Free State prov., Union of South Africa, 32 m. N.E. of Kimberley. Here Lord Methuen defeated the Boers (April 5, 1900). Pop. 1,300.

Bosio, FRANÇOIS-JOSEPH, BARON (1769-1846), French sculptor, born at Monaco; executed bas-reliefs for the column in the Place Vendôme at Napoleon's request. Louis XVIII. made him royal sculptor; Charles X. created him baron. His best-known works are *Cupid darting Arrows* (1808); *Henry IV. as a Child*; *Aristée*, *Dieu des Jardins* (1811), in the Louvre; *Hyacinthe* (1817), also in the Louvre; and an equestrian statue of *Louis XIV.* (1824), in the Place des Victoires, Paris. He also executed busts of Napoleon I. and members of his family, of Louis XVIII., Charles X., etc.

Bosjesman. See BUSHMEN.

Bosna, a river of Bosnia, in the Balkan Peninsula; rises s. of Sarajevo, winds N. past that town, and enters the Save from the right at Samac after a course of 125 m. It is navigable for about two-thirds of its length, as far up as Vranduk.

Bosna Sara. See SARAJEVO.

Bosnia, including Herzegovina under a common administration, formerly a Turkish province,

since 1908 a province of Austria-Hungary, is situated in the N.W. of the Balkan Peninsula, being bounded on the N. by the Save, on the E. by the Drina, on the S. by Herzegovina and by the main range of the Dinaric Alps along the greater part of its S.W. and W. borders. Although the Save is the larger river, the Bosna is economically the more important. The climate is temperate and moist, but severe in winter. The bitter north-easter, the *bora*, sweeps the top of the watershed between the Danube and the Adriatic. The annual mean temperature is 48° F. at Sarajevo (the cap.), 29½° F. in February and 67° F. in July. The province is rich in minerals; mining is now carried on (mainly by the government) for iron and copper, manganese, chromium, quicksilver, and coal. The manufacturing industries are comparatively undeveloped. Forests (coniferæ, beech, oak) cover over 50 per cent. of the surface, but the main resource of the people is agriculture, which since the Austrian occupation (1878) has made a remarkable advance. The breeding of live stock is a large and progressive industry. Foreign trade is as yet small, the exports being principally confined to timber, fruit, coal, iron, chemicals, hides, paper, and live stock. An important line of railway, Gabella-Bocche di Cattaro, which puts Bosnia in direct communication with Herzegovina, was opened in 1900. In all there are over 1,000 m. of railways in the prov. Education is defective, but gains ground slowly. The area of Bosnia is 16,206 sq. m.; the pop., inclusive of Herzegovina (1908), 1,828,379, nearly all of Servian blood. Some 35 per cent. are Mohammedans, 43 per cent. adherents of the orthodox Greek Church, and 21 per cent. Roman Catholics. Chief tn., Sarajevo. The total

trade is valued at nearly £8,000,000 per annum, about equally divided between imports and exports. After forming successively part of Illyria, Pannonia, and Dalmatia, Bosnia was peopled in the 6th and 7th centuries by Slavs. Then for eight hundred years it was subject successively to Serbia, Croatia, and a line of native kings, until, in 1463, it was subjugated by the Turkish sultan Mohammed II. Thereafter it played an important part in supplying the famous Janissary corps of the Turkish armies. In 1849-50 and in 1875 the peasantry (who mostly clung to their Roman Catholic faith) rose in revolt against their masters (countrymen of their own whose ancestors accepted Mohammedanism in order to retain their estates) and against their Turkish rulers. In 1878 the Berlin Congress gave Austria a mandate to occupy and administer Bosnia and Herzegovina, under the nominal suzerainty of the Sultan of Turkey. See J. R. Munro's *Rambles and Studies in Bosnia-Herzegovina* (1895); Nikaschinovitsch's *Bosnia und der Herzegovina* (4 vols. 1901, etc.); Olivier's *La Bosnie et l'Herzégovine* (1901); Rosenfeld-Büchenau's *Kreuz und Halbmond* (1900, etc.); vol. xix. of *Die Österreichisch-ungarische Monarchie in Wort und Bild* (1901); and M. M. Holbach's *Bosnia and Herzegovina* (1909).

Bosporus (also **BOSPHORUS**), or **STRAITS OF CONSTANTINOPLE**, strait, Turkey, separating Europe from Asia, and connecting the Black Sea with the Sea of Marmora. Its length is 17 m., and its breadth is from 1 to 2 m. Its well-wooded shores are elevated and picturesque, with many bays, the most important of which is the Golden Horn. The towns of Scutari, Pera, Therapia (the castles of Europe and Asia), and the city of Constantinople, stand

on the strait. By the treaty of Berlin (1878), which has since been modified, it was stipulated that no warships except those of Turkey should be allowed to pass through. See **DARDANELLES**.

The **CIMMERIAN BOSPORUS** (the Straits of Kaffa), between the Sea of Azov and the Black Sea, was called after the Cimmerii, who were supposed to have lived there. On the w. side of the strait, in the modern Crimea, the Milesians founded a colony in the 6th century B.C., called Bosporus or Panticapæum, the modern Kertch. From the 5th century B.C. it had a dynasty of its own, and its kings were in active communication with Athens, especially in the time of Demosthenes. But in 115 B.C. the last king, being hard pressed by the Scythians, ceded it to Mithridates VI. of Pontus, to whose son Pharnaces it was given by Pompey in 63 B.C. The kingdom was destroyed altogether in the 3rd century A.D. by the Goths.

Bosquet, **PIERRE FRANÇOIS JOSEPH** (1810-61), French marshal, born at Mont-de-Marsan in Landes; served in numerous campaigns in Algiers (1834-52), and fought with distinction at the Alma and at Inkerman, and in the storming of Sebastopol, in the Crimea (1854-5). He was promoted field-marshal and appointed senator (1856). See *Lettres du Maréchal Bosquet* (1830-58).

Bosruck, Alpine tunnel of Austria on the railway which connects Klaus Steyerling on the N. with Selzthal on the S. (25 m.), and thus affords direct communication between Bohemia and the Adriatic. The tunnel, commenced in 1902 and opened in 1905, is 3 m. long, and its summit elevation is 2,405 ft. above sea-level.

BOSSU, **RENÉ LE**. See **LE BOSSU**.

Bossuet, JACQUES BÉNIGNE (1627-1704), French preacher, historian, and controversial writer, was born at Dijon. Educated by the Jesuits of his native town, and at the Collège de Navarre in Paris, he was admitted doctor in theology in 1652, and proceeded the same year to take up the duties of a canon at Metz. Here he entered into controversy with the Protestants, and wrote his *Réfutation du Catéchisme de Paul Ferry* (a Protestant minister of the town). In 1659 he went to Paris, where he soon won reputation as a preacher, and from 1661 preached frequently at the court. Appointed bishop of Condom in 1663, he resigned the see a year later, on being made tutor to the Dauphin. For the Dauphin's instruction he wrote, among other works, the *Discours sur l'Histoire Universelle* (1681), remarkable for its vivid generalizations and sense of historical continuity, and by some considered as the first attempt at a philosophy of history. (See Flint's *History of the Philosophy of History*, 1893.) At this time the question of the rights of the Gallican Church again assumed importance, and Bossuet became its recognized champion in opposition to Fénelon and the Ultramontanes. To the assembly of the clergy in 1681 he preached the sermon *Sur l'Unité de l'Eglise*, designed to effect a reconciliation between the Pope and the king; and he inspired the *Déclaration* of 1682, which formulated the liberties of the Gallican Church. On relinquishing the tutorship of the Dauphin (1681) he was rewarded with the bishopric of Meaux. Thereafter he delivered his most celebrated funeral orations—those on Marie-Thérèse (1683), Anne de Gonzague or Anne de la Palatine (1685), Le Tellier (1686), and, greatest of all, Condé (1687). In 1688 he published *L'Histoire des Variations*

des Eglises Protestantes, and in 1694 *Maximes et Réflexions sur la Comédie*, in which he attacked the theatre, and especially the plays of Molière. He again crossed swords with Fénelon on the burning topic of the Quietist heresy, which he denounced in *Instructions sur les Etats d'Oraison* (1697) and *Relation sur le Quietisme* (1698). From 1697 to 1701 he carried on negotiations with Leibniz to bring about a union of the Catholics and Lutherans, but without success. A man of fervent piety and generous emotions, in theology and politics he was rigorously orthodox and conservative. In the orations the personal panegyric is always employed to illustrate a greater theme—the littleness of earthly greatness in the presence of death; but there are not wanting traits of personal emotion, and in general the style is sonorous, grave, imaginative. In the sermons, though the rhetoric is less elaborate, the poetic sensibility of the preacher finds more abundant expression; the language is pure and limpid, the argument forcible and well sustained, and many of them, as that of *Sur la Mort*, are unequalled in French oratory. The 18th century (e.g. Voltaire) ranked Bossuet below Bourdaloue and Massillon, but modern criticism has restored him to his place as the first of French orators, and considers him one of the greatest masters of French prose. Editions: Versailles (1815-19), 43 vols.; by Lachat, Paris (1862-6), 31 vols.; *Œuvres Oratoires* (1890-3), 6 vols. See Floquet's *Etudes sur la Vie de Bossuet* (1855-6), 3 vols.; F. Brunetière's *Etudes Critiques sur l'Histoire Litt. Française*, vols. ii. and v. (1888); and Bossuet, by G. Lanson (1901).

Bossut, CHARLES (1730-1814), French mathematician, born near Lyons; became professor of mathematics at Mézières (1752), and

a member of the Academy of Sciences (1768). He edited Pascal's works with a memoir (5 vols. 1779), and wrote *Essai sur l'Histoire Générale des Mathématiques* (1802).

Boston, par., mkt. tn., seapt., pail. and munic. bor., on the riv. Witham, 4 m. from the sea, 30 m. S.E. of Lincoln, Lincolnshire, England. The corporation dock has an area of 7 ac., and a quayside of 2,330 ft. Deep-sea fishing, with a fleet of forty trawlers, has proved very prosperous. Some shipbuilding is carried on, and there are lines of steamers for Hull, London, and Hamburg. The chief industries are the manufacture of agricultural implements, sails and ropes, brewing and tanning, iron and brass founding. Timber, pit-props, granite, and ore are imported; coal, corn, and agricultural implements are the chief exports. In Plantagenet times Boston was a chief port of the kingdom, and much frequented by traders of the Hanseatic League. Foxe, author of the *Book of Martyrs*, and Ingram, the founder of the *Illustrated London News*, were natives of the town. The tower of the church of St. Botolph (Boston = Botolph's town) was a conspicuous landmark for mariners. There are a grammar school (1554), a blue-coat school, municipal buildings, and a guildhall. Pop. 16,000. There is an excellent *History of Boston* by Pishy Thompson (1856).

Boston, the capital and largest city of Massachusetts, U.S.A., and fifth in population in the country, is situated at the head of Massachusetts Bay, Suffolk co., 230 m. N.E. of New York. It is a combination of several cities and towns about Boston Harbour and along the Charles R. Besides Old Boston or Boston proper, it includes E. Boston, on Noddle I., S. Boston,

Charlestown (where a granite obelisk marks the scene of Bunker's Hill, the first conflict between British and Americans in 1775), and the suburban districts of Brighton, Roxbury, W. Roxbury, and Dorchester. The area is 43 sq. m. Parks cover 2,620 ac., the best known being the Common, in the heart of Old Boston. In the suburbs is a chain of beautiful parks and boulevards, Franklin Park (520 ac.) being the largest. The school system has long been known as the best in the country. There is one municipal library, containing some 840,000 volumes, housed in one of the finest buildings (1888-95) in the States. Smaller libraries belong to the Boston Athenæum (1807), the American Academy of Arts and Sciences (1780), and the New England Historical and Geological Society (1845). The higher educational institutions include the Massachusetts Institute of Technology (1865) one of the best technical schools in the country. The medical and agricultural schools of Harvard University are located here, as are also Boston College (Roman Catholic; 1860), Boston University (1869), the New England Conservatory of Music (1870), Lowell Institute, and a fine art school. Faneuil Hall (1742), the Old South (1729) and the Old North (1723) churches, and the Old State House (1748) are among many buildings of historical interest. The leading industries include the manufacture of boots and shoes, leather, machinery, furniture, fertilizers, agricultural implements, chemicals, and musical instruments. The ice, fish, dry-goods, and sugar-refining trades rank among the first. Boston is the second port in the United States in amount of commerce. The exports are valued at about £20,000,000 per annum, and are chiefly agricultural implements,

cattle, bread-stuffs, dairy products, leather, raw cotton, distilled spirits, and manufactures of cotton, wool, iron, and steel. The imports are valued at over £26,000,000. The first settlement was made in 1630 by settlers from the Winthrop fleet. The town took a leading part in the revolution, and was the scene of the Boston 'tea party.' In 1872 much of the business portion was destroyed by fire. The new Museum of Fine Arts and the new Opera House, both on Huntington Avenue, were opened in 1909. The intellectual 'culture' of Boston is proverbial. See Winsor's *Memorial History of Boston* (1880-1), Hale's *Historic Boston* (1898), and Lodge's *Boston* (1891). Pop. (1750) 25,000; (1822) 50,000; (1900) 560,892; (1910) 670,585.

Boston Tea Party. In the height of the agitation antecedent to the American revolution, a party of Bostonians disguised as Indians boarded certain ships laden with taxed tea, and threw 350 chests into the harbour (Dec. 16, 1773). This was the Boston 'tea party,' which has been celebrated in song by Oliver Wendell Holmes. In retaliation the home government declared the port closed. See *Cambridge Modern History*, vol. viii. (1903).

Boston, THOMAS (1676-1732), Scottish divine, was born at Duns, Berwickshire. Licensed by the presbytery of Chirnside in June 1697, his power in the pulpit was quickly recognized; but it was not until 1699 that he was ordained minister at Simprin, a small Border parish near Duns. He was translated to Ettrick, in Selkirkshire, on May 1, 1707, the day of the union of England and Scotland, and there he continued to labour until his death. Boston became known throughout Scotland for his defence of the right of the Christian people to

choose their own ministers; his refusal to take the abjuration oath in any form; his opposition to Simson, divinity professor at Glasgow, on account of his doctrinal teaching; and above all for his share in the 'Marrow Controversy,' which profoundly agitated the Church of Scotland for many years from 1718. The works of few theological writers have circulated so widely as his. The treatise on *Human Nature in its Fourfold State* (1720) exercised a powerful influence on the religious life of Scotland. *The Crook in the Lot* (new ed. 1863) was also a great favourite with the Scottish peasantry. His *Memoirs* (1776) are a valuable commentary on his time.

Boström, ERIK GUSTAF (1842-1907), Swedish statesman, member of the Second House of the Swedish Parliament from 1875 to 1893, subsequently of the First House; the champion of protection and leader of the conservatives; prime minister 1891-1900, and again in 1902.

Boström, KRISTOFFER JAKOB (1797-1866), Swedish philosopher, who exercised an extraordinary influence over his pupils by the magnetism of his personality. After studying at the University of Upsala, he became, in 1833-7, tutor of the royal princes; but returned to the university, and in 1840 was made professor, a post he held for twenty-three years. His teaching is highly idealistic, and is reminiscent of Spinoza. His writings were edited by Edfeldt (1883-1901). See papers by Mätzner (1869) and Höfding (1879) in *Philos. Monatshefte*.

Boswell, SIR ALEXANDER (1775-1822), antiquary and poet, was born at Auchinleck, Ayrshire. The eldest son of James Boswell, he succeeded to Auchinleck in 1795, and lived a life of lettered ease. In 1803 appeared *Songs, chiefly in the Scottish Dia-*

lect, and *The Spirit of Tintoc*, or *Johnny Bell and the Kelpie*; in 1810, *Edinburgh*, or *the Ancient Royalty*; and *Sir Albyn* in 1812. He established the Auchinleck Press in 1815, from which issued many valuable reprints, and also his own works, notably *Sheldon Haughs*, or *the Sow is Flitted* (1816). *Jenny's Bawbee* and *Jenny dang the Weaver* (1817) are his best-known songs. He was M.P. for Devonshire in 1818 and 1820. He died from wounds received in a duel, on Mar. 27, 1822. See Thomson's *Collection of Original Scottish Airs* (1809-17), and *Boswell's Works*.

Boswell, JAMES (1740-95), the biographer of Samuel Johnson, was the eldest son of Lord Auchinleck, a Scottish judge, and was born at Edinburgh. He visited London for the first time in 1760. In 1762 he made his first attempt at authorship by contributing to *A Collection of Original Poems by Scotch Gentlemen*. Early in 1763, while passing through London, he was introduced to Dr. Johnson, and a warm friendship sprang up between them. In 1767 he published *Dorando*, a Spanish tale little known; and in 1768, *The Essence of the Douglas Cause*, a defence of the claim of Archibald Douglas to the dukedom of Douglas. In 1768 appeared his *Account of Corsica, with Memoirs of General Paoli*; and in the following year a volume of *British Essays in Favour of the Brave Corsicans*. In 1773 he accompanied Johnson on his journey to the Hebrides. From 1777-9 Boswell wrote a series of papers, called 'The Hypochondriac,' in the *London Magazine*. In 1785 he published the *Journal of a Tour to the Hebrides*, and in 1786 he was called to the English bar. In May 1791 he produced his *Life of Dr. Johnson*. It was a signal success, and a second edition was called for in 1793.

But Boswell succumbed to hypochondria and alcoholism, to which he had given way after his wife's death in 1789, and died in London on May 19, 1795. It is generally conceded that Boswell's *Life of Johnson* stands alone in our language for the faithful portraiture of its subject. No other biography rivals it, and it has well deserved its universal celebrity. Boswell's *Letters to the Rev. W. J. Temple* were published in 1857 (new ed. 1908), and Charles Rogers edited (1874) for the Philobiblon Society a curious tract relating to Boswell, called *Boswelliana*. The best editions of Boswell's *Life of Johnson* are those by Croker (10 vols. 1876), Napier (4 vols. 1884), and Dr. Birkbeck Hill (6 vols. 1887). See Macaulay's *Essays* and Carlyle's *Miscellaneous Essays*, and the *Life of Boswell* by Percy Fitzgerald (2 vols. 1891).

Boswellia, a genus of trees (named after John Boswell, a physician) of the family Burseraceæ, natives of India, Persia, and Arabia. The flowers have five petals and a crenulated granular disc; the fruit consists of a triangular capsule with three valves and three cells, each cell containing one seed. *B. serrata* is a large tree with pinnate leaves, and small pink flowers in axillary racemes. Boswellia is the tree which produces the fragrant resin olibanum, believed to be the frankincense of the Bible.

Bosworth, or MARKET BOSWORTH, mkt. tn. and par., Leicestershire, England, 13 m. w. of Leicester, on L. & N.W.R. Here Richard III. was defeated and slain by Henry, Duke of Richmond (1485). Pop. of par. 800.

Bosworth, JOSEPH (1789-1876), Anglo-Saxon scholar, was born in Derbyshire. While vicar of Little Harwood in Buckinghamshire (1817-29) he published his *Anglo-Saxon Grammar* (1823). From

1829-40 he acted as a chaplain in Holland, and in this time appeared his principal work, the *Anglo-Saxon Dictionary* (1838; new ed. 1882-88), *The Origin of the Dutch* (1836), *Scandinavian Literature* (1839), and a Dutch translation of the *Book of Common Prayer* (1839). From 1840 to 1857 he was vicar of Waithe in Lincolnshire, and after that rector of Water Shelford in Buckinghamshire. In 1858 he was appointed to the Rawlinson professorship of Anglo-Saxon at Oxford, and in 1867 he gave £10,000 for a similar endowment at Cambridge.

Böszörmény, or HAJDU-BÖSZÖRMENY, tn., Hajduken co., Hungary, 10 m. N.W. of Debreczin. Agricutural centre. Pop. 25,000.

Botanic Garden, a garden in which the plants grown, and the method of their arrangement and cultivation, are intended to subserve some definite scientific purpose. The term is wide enough to include such establishments as Kew and the school gardens copied from America by the advocates of nature study. The botanic gardens in connection with universities, and as independent establishments all over the world, are the direct outcome of the physic gardens in which simples were formerly cultivated. In some cases—as, for instance, at Chelsea—the older title has lingered, though, of course, it has long ceased to be properly descriptive. Perhaps the first record of a garden of this kind occurs early in the 14th century, as belonging to a member of the Salernitan school of medicine; and before the first half of that century had run its course, the republic of Venice had also established a garden of a similar kind. With the renaissance and the study of what is now called natural science came the establishment in Italy (Ferrara, Padua, Pisa, Bologna, Florence, Naples) of botanic gardens

in the modern sense. Germany (Nuremberg, Leipzig, Breslau, Heidelberg, Giessen, etc.) and France (Montpellier, Paris) were not long in following the example thus set. The most noted British gardens are those of Oxford (1632), Chelsea (1677), Edinburgh (1680), Kew (1670), and Cambridge (1672). No two botanic gardens are precisely alike in arrangement. The hardy plants have to be arranged with due regard to natural relationships. Geographical distribution on the earth's surface is in many places a prominent feature in the arrangement; and there may be further subdivisions into aquatic, marsh, desert, rock, and mountain plants. There must, of course, be plant-houses of different kinds, one or more with temperature high enough for tropical plants; and here the arrangement is governed by cultural requirements. There must be a herbarium (or collection of dried plants), a museum, a library, laboratories, and a teaching staff. In July 1902 the Chelsea garden was reopened under a new scheme devised by the Charity Commissioners.

Botany is that branch of the wider science of biology which deals with plants. Since the simplest organisms consist of a single cell, it is not an easy matter to draw the line between the lowest plants and the lowest animals. To overcome this difficulty, Haeckel proposed to include both in a group which he called Protista. This, however, has not been generally accepted, and Professor Ray Lankester has said that it is not, after all, of much consequence if the botanist or the zoologist should claim a few of these simple organisms which belong of right to the domain of the other.

History.—Solomon (1 Kings 4: 33) 'spake of trees, from the cedar that is in Lebanon even

unto the hyssop that springeth out of the wall.' There are fragments ascribed with more or less justice to Aristotle (384-322 B.C.), and from him Theophrastus (c. 370-286 B.C.) learned all he knew about plants. The *Materia Medica* of Dioscorides, a Greek physician of the first century of our era, appears to have been the source whence most of the plant-lore of the mediæval herbals was derived; though, as time went on, some kind of description of the plants themselves was added to what was held to be of more importance—an account of their medicinal properties. Not, however, till the first half of the 16th century was there anything like a scientific treatment of the subject, which is generally thought to have commenced with Brunfels of Strassburg (1488-1534), who described 340 species. Lobel, a Dutchman (c. 1538-1616), physician to James I., raised the number to 2,191, which was trebled by Caspar Bauhin in the early part of the 17th century (1623). Among British botanists of the pre-Linnaean period must be mentioned Turner (d. 1568); Morison (1620-83), regius professor of botany at Oxford; and John Ray (1628-1705), who introduced the word 'species' in a technical sense, and to whom we probably owe the first clear idea of a natural system. Linnaeus (1707-78) is justly reckoned the father of modern botany. Not only did he systematize it; he enlarged its province by sending many of his best pupils to explore and collect in regions where no scientific work had been done.

Classification.—Early systems were on broad lines, taking little note of minute differences. Thus for a long period 'herbs, shrubs, trees' were the only classes recognized. Then followed an alphabetical arrangement. Cæsalpinus, physician to Pope Clement VIII., in 1583, published a system based

chiefly on the fruit; but Tournefort (1656-1708), professor of botany at the Jardin des Plantes, Paris, drew up a scheme which held its ground till the days of Linnaeus. It had two main divisions—herbs and trees. Under herbs were three subdivisions—(1) with simple flowers; (2) with compound flowers; and (3) destitute of flowers, including grasses, ferns, and mosses. The trees were divided into four groups, based on the characters of the petals. The characters and arrangement of the reproductive organs (stamens and pistils) were the basis of the Linnaean system (1735). It consisted of twenty-four classes, of which the last contained the mosses, ferns, lichens, seaweeds, and fungi, while the rest comprised the flowering plants. This was avowedly provisional, and intended to pave the way for a natural system based on relationships of which the sum of the characters was to be the test. Of this only a fragment was issued in 1738. Antoine Laurent de Jussieu (1748-1836) worked on the lines of relationship; but no classification indicating real relationship was possible till it was attempted on the basis of evolution. The following gives the principal points of such a classification, omitting details on which there is much difference of opinion:—

1. Cryptogams. (1.) Thallophytes.—Single or many celled plants, the vegetative portion not being differentiated into leaves and stem. Here are grouped bacteria, diatoms, algæ, fungi, and stoneworts. (Lichens are not regarded as distinct plants, but as resulting from the union of a fungus and an alga.) (2.) Bryophytes.—The liverworts spring from a thallus, while the mosses show division into stem and leaf; but none have true roots. (3.) Pteridophytes.—These show relation-

ship to the flowering plants in having root, stem, and leaves, and in the possession of vascular bundles.

2. Phanerogams, the true flowering plants. (1.) Gymnosperms.—The flowers always unisexual, generally naked, though in a few cases there is a small perianth consisting of scale leaves. The cycads and conifers constitute nearly the whole class. (2.) Angiosperms.—The flowers generally hermaphrodite, and provided with a perianth divisible into calyx and corolla. Here belong the grasses, herbaceous plants, and shrubs, and all foliage trees. There are two sub-classes: (a) Monocotyledons—seed with a single cotyledon or root leaf; stem usually simple, as in the palm; (b) Dicotyledons—seed with two root leaves; stem generally well branched.

Morphology.—Here we have to do with external form and internal structure. The simplest conceivable plant-form is a single spherical cell, such as may be met with in some of the fresh-water algae, though an aggregation of such cells is more common. The next step in development is shown by the attachment of plants by a base, and the formation of a growing point, or apex, at the opposite extremity. This may be seen in sea-lettuce. In the bladderwrack, an equally common seaweed, the branching of the original apex gives rise to a number of growing points. In the mosses, with stem and leaves, there is a foreshadowing of roots in the rhizoids by which these plants attach themselves to the surfaces on which they grow. In the next higher group, the ferns and their allies, true roots are present, so that they resemble the phanerogams in this respect. A typical phanerogam consists of a root, or descending axis; a stem, or ascending axis, which may be simple or branched; and the leaves—all subserving the

purpose of nutrition. Leaves vary greatly in size and in shape, and all the appendages of the stem or branches may be traced to modifications of the foliage or surface leaf, which normally consists of an expanded portion called the blade, connected with the stem by a petiole or leaf-stalk, which may be protected at the base by a sheath, or by leaf-like appendages called stipules at each side. The typical flower of the angiosperms consists of four whorls of metamorphosed leaves, arranged thus from the outside: calyx, formed of sepals; corolla, formed of petals; the androecium, or male system, consisting of anthers containing pollen; the gynoecium, or female system, the important part of which is the ovary, containing the ovules, surmounted by a style, expanded at its apex into a stigma. The first two whorls are protective of the others, which are the reproductive organs. If both systems are present, the flower is bisexual; if either is absent, it is unisexual, and the sex is determined by the system present. If male and female flowers grow on the same plant, it is said to be monoecious; plants bearing only male or female flowers are dioecious. Of the former, the box is an example; of the latter, the common nettle. Internal morphology (often called histology or vegetable anatomy) shows how this structure is built up. In all organisms the ultimate unit is the cell. Hooke was the first to detect plant cells, and figured dead cork cells in his *Micrographia* (new ed. 1667). Their importance, however, was not recognized till Schleiden's work in 1838 showed that plants were built up of cells and modifications of cells. In its simplest form a plant cell is more or less globular. When aggregated, plant cells may be of various forms and sizes, and, in addition

to the protoplasm, contain a nucleus; there may also be chlorophyll, or green colouring matter (sometimes masked by other pigments, as in red and brown seaweeds), starch grains, aleurone grains, and crystalline bodies. Aggregations of cells constitute cellular tissue, well seen in the leaves and stem of mosses. Vascular tissue, of which there are many modifications, is formed of rows of superposed cells, the walls of the adjacent cells in each row having been absorbed, thus forming tubes. Aggregations of vascular tissue (vascular or fibro-vascular bundles) are always found in the phanerogams, though they may be first clearly made out in the ferns and their allies, and there seems to be a foreshadowing of them in the mosses.

Physiology is concerned with plants as living organisms—i.e. with the functions of the organs of nutrition and reproduction. In the simplest form—such as slime fungi (by some claimed as animals)—food may be taken in at any part of the body, while reproduction is effected by means of single-celled bodies called spores. This method is peculiar to the cryptogams, in some of which, however, there is alternation of generations, well seen in the ferns, where the spore gives rise to a leafy growth, on which are developed male and female systems, and from the union of the products of these systems new fern plants arise. The food of plants (with some few exceptions) is liquid and gaseous. The former is water combined with various earthy salts, and is absorbed by the roots; the latter consists of carbon dioxide, absorbed from the atmosphere by the leaves, in which it is broken up under the influence of sunlight, the carbon being retained to nourish the plant, while the oxygen is given back to the air.

The crude sap (the water impregnated with salts) taken up by the roots passes through the stem to the leaves, where starch is formed and free oxygen given off. During the darkness the starch is dissolved in the cell sap, and passes downwards through the tissues of the stem. By the leaves excess of carbon is got rid of through the absorption of oxygen and the giving off of carbon dioxide in the process of respiration, and by their stomata or pores excess of moisture is exhaled in the process of transpiration. The reproduction of the higher plants is sexual. In the stamen the essential part is the anther, or little bag at the top, containing the pollen grains or male cells, while the ovules in the ovary enclose the female cells in the embryo sac. When in the process of fertilization the pollen is shed on the stigma, the grains send out tubes which carry the male cells down to the egg cells. By this process, and by consequent changes, the ovule becomes a seed, and the persistent parts of the flower a fruit.

Geographical Distribution.—With the general adoption of the theory of evolution, and the disappearance of that of special creation, the distribution of plants on the earth's surface had to be accounted for. This led to the mapping out of the globe into regions and sub-regions, characterized by a distinctive flora. About forty years ago George Bentham distinguished three distinct floral regions:—1. Northern, characterized by conifers and the catkin-bearing *Arntaceæ*, and its vast assemblage of herbaceous plants, and having three subdivisions—Arctic-Alpine, Intermediate or Temperate, and Mediterraneo-Caucasian. 2. Southern, broken up, so that the connection is only traceable by the possession by two or more of them of the large characteristic

groups, such as the Restiaceæ, Proteaceæ, Diosmeæ, etc. The divisions are the Antarctic-Alpine, Australian, Andino, Mexico-Californian, and South African. 3. Tropical, characterized by the Anonaceæ, Restiaceæ, Proteaceæ, palms, and giant grasses, with three divisions—Indo-Malayan, American, and African. These nearly correspond to the later divisions—Boreal, Tropical, and Austral—of Oscar Drude, though he had a greater number of subdivisions or 'floral domains,' and separated the aquatic from the land flora.

Fossil Plants.—It was not till the beginning of the 19th century that anything of importance was done in the study of fossil plants, and the first book published in Britain on the subject was Lindley and Hutton's *Fossil Flora of Great Britain* (1831-7). This study has confirmed the theory of evolution; for with plants, as with animals, there is an upward tendency from the lower and older to the higher and more recent rocks. In the Primary or Palæozoic rocks seaweeds occur as low as the Silurian; and in the Upper Silurian, ferns, horse-tails, and lycopods, which attained their maximum in Carboniferous times, marked also by conifers and cycads. Palms and dicotyledons appear in early Tertiary times.

See A. Kerner, *The Nat. Hist. of Plants* (Eng. trans. by F. W. Oliver; new ed. 1902); Henfrey, *Elementary Course of Botany* (4th ed. 1884); Henslow, *How to Study Wild Flowers* (1896); Lord Avebury, *British Wild Flowers*, 'Nature Series' (1873).

Botany, bay and suburb (5 m. s.) of Sydney, New South Wales, a popular picnic resort, with a magnificent beach (Lady Robinson's Beach) on the w. side of Botany Bay. On the s. side of the bay is a monument commemorating the landing of Cap-

tain Cook on April 28, 1770. The place is popularly associated with the transportation of criminals (stopped in 1840), the British government having sent Commodore Phillip to found a penal settlement there in 1787. He, however, selected a more suitable site a little farther north. Pop., including Botany North, 7,200.

Bot-fly, or HORSE BOT-FLY (*Gastrophilus equi*), an insect which lays its eggs on the hair of horses, especially the hair of the legs and breast. The animal, apparently owing to irritation having set up at the spot, licks the eggs or larvæ off, and the latter thus ultimately reach the stomach. Here they attach themselves to the mucous membrane, and feed on the gastric secretions. When mature, the larvæ quit the body of the host with the fæces; and after pupation the winged adults emerge, to begin the cycle anew. The warble-flies (*Hypoderma*) of oxen and the nostril-flies (*Estrus*) of sheep are related forms, to which the name of bot-fly is sometimes extended.

Both, JAN (1610-52), Dutch painter, one of the first of his countrymen to become Italianized. He went to Rome with his brother Andreas (1609-50), who painted figures and animals into his landscapes. His subjects are the Italian lakes; his work is in the style of Claude Lorraine, wrought in warm colour, with beautiful sunlight effects. Chief works: *Landscape with Muleteers*, and five others (National Gallery, London); *Artist studying from Nature* (Amsterdam, Van der Hoop collection); *Baptism of the Eunuch* (Buckingham Palace, London); and landscapes in Dulwich, S. Kensington, and Wallace collections, London. See H. Havard's *Dutch School of Painting* (trans. by G. Powell, 1885).

Botha, LOUIS (1863), premier of Transvaal (1908) and first prime

minister of the Union of South Africa (1910), was born at Greytown, Natal, but spent most of his early life in the Vryheid district of the Transvaal. In the old days he fought under Lukas Meyer, when he went to the assistance of Dinizulu, and also joined his friend in founding the 'New Republic' in 1884. As a member of the Volksraad for Vryheid, he, together with Delarey, took a liberal view in politics. When war was declared, Assistant Field-cornet Louis Botha fought as Lukas Meyer's subordinate at Dundee (October 1899); but when his old friend retired, ill, to Pretoria, Botha was given the command of the Utrecht, Vryheid, and Wakkerstroom commandoes. On December 6, 1899, Botha was appointed commander of the Tugela positions, against General Buller; and on March 27, 1900, on the death of General Joubert, he succeeded him as commandant-general. Botha's history from the time he assumed command on the Tugela is, in fact, the history of the war from Colenso (Dec. 15, 1899) down to the signing of the terms of surrender at Vereeniging (May 31, 1902). An effort to bring about a cessation of hostilities was made by Kitchener and Botha in Feb. 1901; but the latter broke off the negotiations on March 16. Soon after the conclusion of peace, Botha, with De Wet and Delarey, left S. Africa on a mission to England, where they were received by King Edward VII. (Aug. 17, 1902). Since his return home to S. Africa General Botha has taken a prominent part in all movements directed towards the abolition of racialism, and the development of a united South African nation. He was delegate to the Colonial Conference of 1907, and was made a Privy Councillor. He also took a prominent part in the National Convention

which drafted the South African Constitution. He is married to a lady who claims a blood relationship with Robert Emmet, the Irish patriot.

Bothie, or **BOTHY**, a small cottage or hut; also a house for the accommodation of the unmarried outdoor male labourers in the employment of a farmer in Scotland, in which the inmates prepare their own food, and live without any domestic assistance. In some localities unmarried female farm-labourers are similarly lodged.

Bothnia. See SWEDEN. For GULF OF, see BALTIC SEA.

Bothriocephalus, a genus of tapeworms, of which *B. latus*, the broad or Russian tapeworm, occurs frequently in man. The first stage occurs in fish, especially the pike and burbot. In consequence, the parasite is particularly common in countries where much fish is eaten in an uncooked or imperfectly-cooked state. The adult tapeworm has two suckers, but no hooks, and may reach a length of eleven yards; the eggs hatch into free-swimming ciliated embryos—a very remarkable fact among tapeworms.

Bothwell, tn. and par. (13,595 ac.), N. Lanarkshire, Scotland, on r. bk. of river Clyde, 8 m. S.E. of Glasgow; sandstone quarries, coal mines, and iron mines. Part of the town is a residential quarter for Glasgow merchants. About a mile S.E. is Bothwell Brig, in the haughs around which (June 22, 1679) the Covenanters were routed by the Duke of Monmouth. (See Scott's *Old Mortality*.) Joanna Baillie, the poetess, was born here in 1762. Pop. par. 46,000; tn. 3,000.

Bothwell, JAMES HEPBURN, FOURTH EARL OF (?1536-78), husband of Mary Queen of Scots, was descended from a family connected with the Hepburnes or Haybourns in Northumberland, of whom the first to settle in Scotland was Sir Adam. Patrick,

third Lord Hailes, created Earl of Bothwell in 1488, owed his earldom and the increased prosperity of his family to his support of James IV. against James III. at Sauchieburn. His grandson, Patrick, third earl (1512-56), was at an early period of his career concerned in intrigues with England, and although afterwards a strenuous supporter of Beaton and Mary of Guise (for whose hand he became a suitor), he in 1547 entered into a secret agreement with England. The son, fourth earl, after succeeding (1556) his father, led certain Border attacks on the English, and in October 1559 intercepted £3,000 sent by Elizabeth for the use of the Lords of the Congregation. In 1560 the queen-dowager entrusted him with a special mission to France. After her death he was, in January 1564, sent a prisoner to England, whence he was permitted to go to the Continent. Recalled by the queen in 1565 to assist her in subduing Moray's rebellion, he, after the murder of Rizzio in March 1566, gradually acquired a supreme influence in her counsels; and there can be no doubt that his determination to secure her hand was the chief cause (though there were others) of Darnley's murder. At the same time, both he and the queen were the dupes of cooler and cleverer intriguers, and his marriage rendered the ruin of both inevitable. At Carberry Hill (June 15, 1567) the queen, to save Bothwell's life, made arrangements by which he should be permitted to escape. After lurking for some time in the north of Scotland, he made an attempt to establish himself in the Orkneys as a kind of pirate; but on being pursued by Kirkcaldy of Grange, he escaped to Denmark, arriving at Copenhagen on September 30, 1567. At first he met with a favourable reception, but he was never at liberty. In June 1573

he was removed from the castle of Malmö to close imprisonment at Drangholm, in Zealand, where he died (Apr. 14, 1578). He was succeeded by FRANCIS STEWART HEPBURN (d. 1624), eldest son of John Stewart, prior of Coldingham (an illegitimate son of James V.), his mother being Lady Jane Hepburn, only sister of the fourth Earl of Bothwell. Inheriting in excess the unruly characteristics of the Hepburns, the fifth earl, as a veiled pretender to the throne, kept King James VI. in perpetual perturbation, until the king, in February 1594-5, persuaded the kirk to excommunicate him; upon which he fled the kingdom, and died in great poverty at Naples. See the various histories of Scotland; *Les Affaires du Conte de Boduel* (Bannatyne Club, 1829); Memoir in Chalmers's *Life of Mary Queen of Scots*; Schirn's *Life of Bothwell* (English ed. 1880). Ayton has made the fourth earl the subject of a long poem, and Swinburne of a drama (1874).

Botocudos, a primitive Brazilian people who are at present confined to the Aymores coast between the Rio Doce and Ilheos, but who formerly occupied a great part of the eastern seaboard, and spread inland as far as the Tocantins basin. Owing to their savage customs, cannibalism, and intractable disposition, they were treated as wild beasts by the early European settlers, and their numbers were thus reduced from perhaps 60,000 or 70,000 to less than 15,000 in 1900. They call themselves *Nac-nanuk*, 'sons of the soil,' and undoubtedly represent the aboriginal element in E. Brazil, being distinguished by round, flat features, rather oblique eyes, small nose, and a general Mongolian expression, heightened by a dirty yellowish complexion.

Botone, or BOTONNY, in heraldry, said of a cross the ends of whose arms are shaped like trefoils or buds.

Botosani, or BOTOSHANI, tn., Roumania, 60 m. N.W. of Jassy; divided into an inner, badly-built town, and handsome suburbs full of boyar palaces. Pop. 33,000, over sixty per cent. of whom are Jews.

Bo Tree, also called PIPAL or PREPUL, the *Ficus religiosa*, or sacred fig tree of India, held in veneration by the sect of Vishnu (who is said to have been born under its leaves), and also by the Buddhists. It is a tree of considerable size, with sap abounding in caoutchouc, while it also yields lac, the lac insect making its abode in the branches.

Botrychium. See MOONWORT.

Botta, CARLO GIUSEPPE (GUGLIELMO (1766-1837), Italian historian, born in Piedmont; favoured the French revolutionary party, and, after suffering imprisonment for his views (1792-4), entered the French service as military surgeon. After holding posts in Italy, he became a member of the French legislative body (1804), and was appointed rector of the academies of Nancy and Rouen (1817-22). In 1809 Botta published at Paris his *Storia della Guerra dell'Indipendenza d'America*. More important is the *Storia d'Italia dal 1789 al 1814* (Par. 1824; Eng. version, Lond. 1826), a narration of events of which the author had largely been an eyewitness. He shows himself a partisan throughout; but the work is written with an enthusiasm and in a style which secured it a great popular success, and the prize of the Accademia della Crusca. A third essay, the *Storia d'Italia continuata da quella del Guicciardini dal 1534 al 1789* (1832), is a comparative failure. See *Lives* by Dionisotti (1868) and S. Botta (1877); also Pavesio, *C. B. e le sue Opere Storiche* (1874).

Botta, PAUL EMILE (1802-70), archæologist, son of the preced-

ing, born at Turin. He became successively French consul at Alexandria, Mosul, Jerusalem, and Tripoli. In 1843 he began a series of archæological investigations among the Babylonian ruins, and conveyed to Paris a large number of fragments of monuments, which now form an Assyrian museum. His chief works are *Mémoires de l'Écriture Cuneiforme Assyrienne* (1848), *Monument de Ninive* (1849-50), and *Lettres sur ses Découvertes à Khorsabad* (1845).

Bottego, VITTORIO (1861-97), Italian traveller, explored the Juba (1892-3). In the course of a second journey (1895-7) he explored the region around Lakes Margherita and Rudolf, and the sources of the Sobat, but was killed by the Somalis. He wrote *Viaggi di Scoperta nel Cuore dell'Africa* (1895). His second journey is described in Vannutelli and Citeri's *Seconda Spedizione Bottego* (1899).

Bottesini, GIOVANNI (1823-89), famous player on the double-bass, was born at Crema in Lombardy, and died at Parma. After studying at Milan, he made tours over Europe and America, often visited Britain (first in 1849), and everywhere created an immense sensation. He was also a director —e.g. at Paris (1855-7), Palermo (1861-2), Barcelona, London (1871), Cairo. In 1887 his oratorio, *The Garden of Olivet*, was produced at the Norwich musical festival. He also composed operas, and wrote a work on his instrument.

Botticelli, ALESSANDRO ('SANDRO') DI MARIANO FILIPEPI (1447-1510), Florentine painter, took his name from the goldsmith to whom he was apprenticed. For painting he was placed under the best master of the day, Fra Lippo Lippi, and later studied with Pollaiuolo and Leonardo. Botticelli was a man of marked originality and poetical imagination, and by nature a mystic and sym-

bolist. His work is marked by brilliance of colour, admirable lineal decoration, and exquisite delicacy in the execution of flowers, foliage, stone-work, jewels, etc. There is charm in his figures—in the melancholy of the face, in the floating, curving draperies. The known details of his life are few. His finest work was done under the patronage of the Medici. He owed the inspiration of his mythological and classical subjects to the poet Poliziano, and to Leon Battista. In 1478, upon the murder of Giuliano de' Medici, he painted the portraits of the murderers on the walls of the Bargello; and in 1480 he commemorated Lorenzo's victory over the Pazzi faction by painting the fine *Pallas and the Centaur* now in the Pitti Palace. In the *Adoration of the Magi* (Florence Academy) all the members of the Medici family are represented as participating in the scene. In 1481 he was called to Rome, and there painted in the Sistine Chapel three frescoes, containing admirable groups of energetic, vital figures. His chief paintings comprise *Venus rising from the Sea* (Uffizi, Florence); *Spring*, or *Venus and the Graces* (Florence Academy); the exquisite circular panel of *Madonna and Child* (Uffizi); *Annunciation* (Uffizi); *Venus and Mars* (National Gallery, London); *Calumny* (Uffizi). In 1500 he painted the symbolical *Nativity* (National Gallery, London). In his later years he devoted himself to engraving, and, since his income from painting ceased, he fell into such distress that he would have died of hunger but for the charity of Lorenzo de' Medici and other friends. Among these engravings are the designs (Berlin) of the *Inferno* for Landino's edition of Dante (1481)—slight suggestive sketches that reveal the fantasy of the artist rather than the conception of the poet. There are about 250 engravings, dating to

the end of the 15th century, drawn with severe outline and straight lines of shading; the subjects are religious and mythological. Of these, Botticelli is usually credited with the design, and Baccio Bandini with the execution. See Supino, *Sandro Botticelli* (1900); Plunkett, *Sandro Botticelli* (1900); Steinman, *Botticelli* (Eng. trans. 1901); Berenson, *Florentine Painters of the Renaissance* (1898); Cole, *Italian Masters* (1892); Cartwright, *Sandro Botticelli* (1904); Crowe and Cavalcaselle, *History of Painting in Italy* (1864); and H. P. Horne, *Botticelli* (1908).

Böttiger, CARL VILHELM (1807-78), Swedish author; professor of æsthetics (1856) and modern literature (1858) at the University of Upsala; early published several volumes of poetry remarkable for great beauty of style, and a mild elegiac tenderness not without a touch of morbid sentimentality—e.g. *Nyare sanger* (1833) and *Lyriska Stycken* (1837-9). Böttiger's *Mémoires* of his father-in-law, Tegner, whom he succeeded as a member of the Academy, Stagnelius, Kellgren, and others, are admirable both as literature and as criticism. His collected works appeared in 6 vols. (1856-81).

Bottini, ENRICO (1837-1903), Italian surgeon, was born at Stradella, prov. Pavia. In 1865 he became lecturer in obstetrics and surgery at Novara. In 1866 he anticipated Lord Lister by publishing a work on the use of carbolic acid in surgical operations; and he was one of the first to recognize the part played by parasitic organisms in the etiology of morbid conditions. In 1877 he was appointed professor of surgery at Pavia, a chair occupied by Scarpa and Porta. Here he distinguished himself by remarkable advances in operative surgery. In 1887, on the death of Depretis, he resigned his chair



Botticelli's 'Virgin and Child, with St. John and an Angel'
(National Gallery, London).

on his election as deputy for Stradella. He returned for a time to his professorship, but died in retirement at San Remo.

Bottle, a vessel with a narrow mouth for holding liquids. The first bottles were probably made of the skins of animals, principally goats. Not only are skin bottles represented on the monuments of Egypt, but Herodotus describes how those Egyptian bottles were made—by sewing up the skin and making one of the legs to serve as a neck. Repeated reference is made in Scripture to the skin bottles of the ancient Hebrews, and vessels of this nature were also used by the Greeks and Romans. Skin bottles are still employed in S. Europe, W. and Central Asia, and Africa for holding wine or water. But the ancient Egyptians had bottles and vases of various other materials, such as stone, alabaster, porcelain, ivory, gold, silver, bronze, and glass, some of them of beautiful design. The Phenicians and Romans also made bottles of glass. Earthenware bottles were possessed by the Egyptians and Hebrews, and are still used in the East. Venice held the monopoly of the manufacture of glass bottles during the middle ages. In China, beautiful bottles of various forms and substances, such as jade, agate, and rock-crystal, have long been known.

Bottles made of the dried rind of gourds are used by the Italian peasantry. In the middle ages leather bottles were in common use in Europe, and the sign 'The Leather Bottle' is still used for inns. Modern bottles are mostly made of glass, though earthenware or stoneware bottles for special purposes are extensively manufactured. Some years ago the manufacture of unbreakable paper bottles was started in the United States. A long slip of paper is made into a tube by

being wound round a revolving mould; the bottom and neck are afterwards added. The outside is glazed, and the inside coated with an acid-resisting medium.

Bottle-making is the simplest branch of glass-working. The operator gathers sufficient molten glass on the end of his blowpipe, partially inflates it by the breath, and drops it into a brass or iron mould, in which it is blown into its permanent form. The jagged mouth is moulded in the working furnace or 'glory-hole,' and the bottle is placed in the 'leer' or annealing tunnel, where it is tempered. The moulds, which are either in two pieces, hinged at the base, or in three pieces, one for the body and two for the neck, are kept at a red heat during use. The blowing is now done, especially in the case of wide-mouthed bottles and jars, by machinery. See GLASS.

Bottle Chart. See OCEAN, CIRCULATION OF.

Bottle Gourd, or CALABASH, a plant of the genus *Lagenaria* and order Cucurbitaceæ. The common bottle gourd is a native of India, and is cultivated in other warm climates. It is a creeping plant with white flowers, and its bottle-shaped fruit, with a hard rind, used for holding water, is termed a calabash.

Bottle-nose, in zoology, a name applied to various members of the order Cetacea, but especially to *Hyperoodon rostratus*, the bottle-nose whale, which reaches a length of about 30 ft., and inhabits the N. Atlantic Ocean. It resembles the sperm whale in possessing an oil cavity on the top of the head, from the contents of which spermaceti is made. The blubber also yields a valuable oil resembling sperm oil. As in the case of the sperm whale, the food consists chiefly of cuttles.

Bottling Machine, a machine constructed for filling bottles.

Many machines have been patented for the purpose, suitable for bottles provided with corks and for those with glass ball stoppers, the latter being chiefly used for aerated waters. Previous to bottling, care must be taken to see that the bottles are thoroughly clean, by leaving them in hot water containing soda, and washing them afterwards in cold water. The bottling machine for ordinary liquor is of a simple character, the commonest consisting of a small trough connected with a barrel, the contents of which flow through six siphon tubes by sucking the air out of which the workman starts the machine. The aerated-water machine is more complicated, as provision is made for the bottle being raised into position and filled, while means have to be taken to prevent the escape of gas, and to lift the glass ball in order to close the neck of the bottle. The best machine of the kind is that of Codd.

Bottomley, HORATIO W., financier, journalist, and sportsman; has been Liberal M.P. for South Hackney since 1906; nephew of George Jacob Holyoake, the founder of the modern co-operative movement, and friend and political colleague of Charles Bradlaugh; closely connected with many financial undertakings and several successful journalistic enterprises, notably the *Financial Times*, *John Bull*, and *Mrs. Bull*, which he founded. He came prominently before the public as the principal defendant in the famous case of *Reg. v. Bottomley and Others*, tried before Mr. Justice Hawkins in 1893.

Bottomry. Money advanced to a shipowner or his agent in the course of a voyage, for the use of a ship and on the security of a ship (a ship's *bottom*), the repayment of which is conditional on the ship reaching its destination, is known as bottomry. A

bottomry contract must be in writing; it is a bottomry bill if it is a deed poll, a bottomry bond if in the form of a bond. A captain or master has an implied authority to borrow money on bottomry, but only for the purpose of completing the voyage, and if all other means of raising money fail. Bottomry takes priority over a mortgage, or a subsequent purchase without notice, but not over claims for wages, salvage, pilotage, etc. When several bottomry bonds are given owing to necessity, the later rank for payment before the earlier, the latest ranking first. If the ship be lost during the completion of the voyage, the holder of a bottomry bond loses his money.

Bottrop, comm., dist. Münster, prov. Westphalia, Prussia, 9 m. N.E. of Duisburg, with coal mines. Pop. 34,000.

Botulism. See FOOD POISONING.

Botzaris. See BOZZARIS.

Botzen. See BOZEN.

Bouch, SIR THOMAS (1822-80), English civil engineer, was born at Thursley, Cumberland. In 1849 he became manager and engineer of the Edinburgh and Northern Ry., now part of the N.B.R. system, and proposed and carried into effect a 'floating railway' for shipping goods trains across the firths of Forth and Tay. He designed several large railway viaducts, including the Redhugh viaduct at Newcastle, and the Deepdale and Beelah viaduct on the South Durham and Lancashire Ry. He is best remembered as the designer of the first Tay Bridge, begun in 1870 and finished in 1877. In June 1879 he was knighted. The bridge fell on Dec. 28, 1879, with a train loaded with passengers which was crossing. He never recovered from the shock, and died the following year.

Boucher, FRANÇOIS (1703-70), French painter and decorator of the Louis xv. period. He was the pupil of Le Moine, and was to some extent influenced by Watteau. His imagination was extremely fertile, his hand facile, and his brilliant, daring, superficial work appeals frankly to the eye and to the senses. A hard worker, he lived also a life of pleasure, and gradually the precision of his early work gave way to the perfunctory and unpleasing pictures of his decadence. His decorations for the boudoir of Mme. de Pompadour, his friend and patroness (some of his most charming work), were bought by the Marquis of Hertford. He painted several portraits of his patroness, one of which is in Edinburgh, another in South Kensington; and also painted pastoral and religious subjects, designed tapestry, and executed scene-paintings. He was professor of painting in Paris (1744), member of the Academy of Painting (1734), and was appointed (1765) painter to the king. After France, the Wallace Collection, London, possesses the greatest number of his pictures. See Lady Dilke's *French Painters of the Eighteenth Century* (1899), and Haldane MacCall's *Boucher: the Man, his Times, his Art, and his Significance* (1908).

Boucher de Crèvecœur de Perthes, JACQUES (1788-1868), French author and archæologist, who advocated extreme views of the antiquity of man, basing his arguments on the human remains found in the Moulin-Quignon quarry, near Abbeville. His chief works are *De la Création* (1839-41) and *Antiquités Celtiques et Antédiluviennes* (1846-65). See *Life*, in French, by Ledieu (1885).

Bouches-du-Rhône, dep. of S. France, on the Mediterranean, E. of the Rhone. It contains large tracts of uninhabitable

land, such as the Camargue, or alluvial and malarial delta of the Rhone; the Crau, on the l. bk. of the E. branch of the Rhone, considered as an ancient stony delta of the Durance; and the Etang de Berre. The coastline is 80 m. in length. The east is hilly, being traversed by three ranges more or less parallel to the coast. The climate is hot and dry, with occasional strong north winds (*mistral*). The chief product is fruit, such as the olive, fig, almond, and mulberry. Cattle, horses, and sheep are extensively raised. The only minerals are lignite and bauxite. Industry and commerce are mainly concentrated in Marseilles, the capital. Area, 2,026 sq. m. Pop. 766,000.

Boucicault (orig. BOURCICAULT), DIONYSIUS ('DION') LARDNER (1822-90), Irish dramatist and author, made his first appearance at the Princess's in 1852, and was considered the best 'stage Irishman' of his day. His first play, *London Assurance*, won success at Covent Garden in 1841. His title to fame, however, rests on *The Colleen Bawn* (Adelphi, 1860), *The Octoroon* (Adelphi, 1861), *Arrah-na-Pogue* (Princess's, 1865), and *The Shaughraun* (Drury Lane, 1875), which are of the best type of romantic domestic melodrama. He spent many years (1853-60 and 1876-90) in New York, where many of his plays were produced; but his last appearance as an actor was made in London in 1886.

Boufarik, or BOUFFARIK, tn., Algeria, 23 m. S.S.W. of Algiers by rail, now one of the healthiest spots in Algeria. Pop. 10,000 (Europeans, 5,800).

Boufflers, STANISLAS, MARQUIS DE (1738-1815), French poet, born at Nancy. He became a marshal (1784), governor of Senegal (1785), and member of the French Academy (1788). At the revolution he retired to Berlin, returning to Paris in 1800. His *Œuvres Com-*

plètes were published in several editions (c.g. in 4 vols. 1817). They include *Voyage en Suisse* (1770), a good collection of letters; *Aline* (1761), a story; and *Poésies et Pièces Fugitives* (1782). An edition of his *Poésies Diverses* was published by Uzanne in 1886.

Bougainville, isl. of Solomon group, Pacific Ocean, discovered by Bougainville in 1768; is separated from Choiseul I. by Bougainville Strait. It is 150 m. long by 30 m. wide; alt. 10,000 ft.

Bougainville, LOUIS ANTOINE DE (1729-1811), French admiral, served in Montcalm's campaign in Canada (1756-9), and again in Germany during the Seven Years' war. After a futile attempt to colonize the Falkland Is., he commanded the first French expedition round the world (1766-9), which led to many important geographical discoveries. Bougainville acted as a naval commander in the North American war, and in 1780 became a field-marshal. Napoleon made him senator and count. See his *Voyage autour du Monde* (1771-2; now ed. 1889); Pascal's *Essai sur la Vie et les Ouvrages de Bougainville* (1831).

Bougainvillea, in botany, a genus of the order Nyctaginaceæ, a native of S. America. The flowers are almost hidden by large red or purple membranous bracts, which form magnificent masses of inflorescence. *B. spectabilis* is grown extensively as a creeper.

Bough, SAMUEL (1822-78), Scottish landscape painter, was entirely self-taught, and spent much of his early life wandering about the country sketching. His occupation as scene painter in Manchester (1845), and later in Glasgow and Edinburgh, influenced strongly his later landscape work. About 1849 he was induced by Macnee to devote himself to landscape, and in 1857 became A.R.S.A., and R.S.A. in 1875.

The best of Sam Bough's work is in water-colour, and is marked by boldness of execution and command of atmospheric effects. See his works in Edinburgh National and Glasgow Art Galleries; also *Sam Bough*, by S. Gilpin (1906); and Sarah Tytler's *Modern Painters* (1873).

Boughton, GEORGE HENRY (1836-1905), one of the most graceful and refined of English painters, settled in London in 1862. He was a constant exhibitor at the Royal Academy, to which he was elected associate in 1879, and member in 1896. In 1886 he published, in conjunction with E. A. Abbey, a volume of *Sketching Rambles in Holland. Weeding the Pavement* is in the Tate Gallery, London. See Muther's *Hist. of Modern Painting* (1895-6).

Bougie (Fr. 'candle'), a solid cylindrical instrument passed by surgeons into the membranous passages of the body—e.g. the gullet or urethra. Bougies are made in various sizes and materials. The term is also applied to rods of substances which melt at the body temperature, and are introduced into the body passages as a vehicle for various drugs incorporated with them.

Bougie (anc. *Saldæ*; Arab. *Bejaia*), fort. seapt., Algeria, on bay of the same name, beautifully situated on the slope of Mt. Guraya (2,300 ft.), 120 m. by rail E. of Algiers. It has a large trade in oil and wax, and is celebrated for its wax candles. In the 5th century it was made by Genseric the capital of the Vandal kingdom in Africa. In 708 it was conquered by the Arabs; and in the 10th century a Berber tribe, the Bejaia, took possession of the town, gave it their name, and raised it to such importance that it was called 'Little Mecca.' It had then a population of 100,000, and was the entrepôt between N. Africa and Europe. In 1152 it

became subject to Morocco, and in 1555 to the deys of Algeria, and under their rule it sank lower and lower, until, when the French occupied it in 1833, it was merely a ruinous village. The French have transformed it into a strongly fortified place, which is rapidly growing through commerce. Pop. 16,600 (Europeans, 5,000).

Bouguer, PIERRE (1698-1758), French mathematician, born at Le Croisic in Brittany. With La Condamine, Jussieu, and Godin, he was engaged (1735-42) in measuring a degree of meridian among the Cordilleras of S. America, and put together the results of his discoveries in *Théorie de la Figure de la Terre* (1749). Among other things, he investigated the height of the snow-line, the inclination of the orbits of planets, the expansion and contraction of metals, the deviation of the plummet, density of the atmosphere, and refraction. His experiments in measuring the intensity of light are contained in *Traité d'Optique* (1760).

Bouguereau, GUILLAUME ADOLPHE (1825-1905), French painter, was a pupil of Picot, and studied in Rome (1850-5). His first Salon picture was *Egalité* (before the Angel of Death), in 1849, and he afterwards contributed regularly to the old Salon. He also painted many portraits, and executed decorative work in the churches of St. Clotilde and St. Augustin at Paris. His pictures are mythological, semi-religious, and fanciful in subject. Among the chief are the celebrated *Vierge Consolatrice, La Jeunesse et l'Amour* (1877), *Le Triomphe du Martyre* (1855), at the Luxembourg, Ghent, Marseilles, Dijon, and Bordeaux museums have pictures by him; but the greater number are in private hands, many in America. His *Triomphe de Vénus* (1856) is well known through en-

gravings of it. See Rose Kingsley's *Hist. of French Art* (1899), and Brownell's *French Art* (1902).

Bouhours, DOMINIQUE (1628-1702), Jesuit and etymologist, was born at Paris; entered the order of the Jesuits at sixteen, and became professor of grammar and rhetoric at Paris and Rouen. In 1666 he returned to Paris as tutor to Colbert's eldest son. His works, which were severely assailed by Ménage and others, include *Entretiens d'Ariste et d'Eugène* (1671), *Doutes sur la Langue Française proposés à MM. de l'Académie* (1674), *Manière de bien penser dans les Ouvrages d'Esprit* (1687), and a Life of Francis Xavier, which was translated into English by Dryden (1688). He is specially remembered for the epitaph he wrote on Molière.

Bouillabaisse, or **BOUILLABAISE**, a dish popular in France, especially in the south. It is a kind of stew composed of all kinds of fish, including shell-fish, with herbs and condiments. See Thackeray's *Ballad of Bouillabaisse*.

Bouillé, FRANÇOIS CLAUDE AMOUR, MARQUIS DE (1739-1800), French general, born at Cluzel, in Auvergne, of a noble French family. As governor of Guadeloupe he defended (1778-82) the French Antilles, and captured several islands from the British. As commander-in-chief of the army of the Meuse, the Saar, and the Moselle, he repressed the insurrection of the garrisons of Metz and Nancy (1790). In 1791 he attempted to rescue Louis XVI. during the flight to Varennes. Having been exiled, he entered the Swedish army, and later served under Condé. Finally he settled in England in 1794, and died in London. He published, in English, *Memoirs relating to the French Revolution* (1797).

Bouilly, JEAN NICOLAS (1763-1842), French dramatist and au-

thor, was born near Tours. The sentimental vein in his works procured him the surname of the *poète lacrymal*. Two of his comic operas have music by Grétry (*Pierre le Grand*) and Cherubini (*Les Deux Journées*) respectively; others were *L'Abbé de l'Épée* (1795), *Fanchon* (1803), *Mme. de Sérigné* (1805). He also wrote *Contes à ma Fille* (1809) and *Conseils à ma Fille* (1811). He held various public appointments during the revolution. See Carré de Busserolles's *Notice Biographique de J. N. Bouilly* (1875).

Boulainvilliers, HENRI, COUNT DE (1658-1722), French historian, born in Normandy. His works include *Histoire des Arabes* (2 vols. 1731), and an incomplete *Vie de Mahomet*.

Boulak. See BULAK.

Boulanger, GEORGE ERNEST JEAN MARIE (1837-91), French general and agitator, was born at Rennes, and educated at St. Cyr. He saw service in Algeria, Italy, and Cochin-China, and was at Metz with Bazaine in 1870; but he escaped capture by the Germans, and shared in the defence of Paris. He was appointed brigadier-general in 1880, and commanded the army of occupation in Tunis in 1884-5. In January 1886 he was appointed minister of war in the Freycinet cabinet, when the various manifestations of his strongly democratic spirit soon made him the idol of the populace—'Le Brave Général.' In May 1887, however, he was removed from the office of war minister, and shortly afterwards placed under arrest for attacking his successor, and in March 1888 was deprived of his command and placed on the retired list. In July 1888 he fought a duel with the prime minister, M. Floquet, whom he had insulted. Boulanger, now the idol of the Parisian populace, was returned for the city by a crushing majority, and was also favoured

by the royalists; but on April 2, 1889, he caused considerable excitement by suddenly disappearing from Paris, to escape an impending prosecution by the French government. At the elections in September Boulangism suffered a crushing defeat, though Boulanger himself was returned for the Montmartre division of Paris. His election, however, was declared invalid, and his opponent was awarded the seat. On Sept. 30, 1891, Boulanger committed suicide in a cemetery near Brussels. See Chincholle's *Général Boulanger* (1889), and Verly's *Gén. B. et la Conspiration Monarchique* (1893).

Boulay de la Meurthe, ANTOINE JACQUES CLAUDE JOSEPH, COMTE (1761-1840), French politician; born at Chaumouzey in the Vosges. He was minister of state during the 'Hundred Days,' and was banished from 1815 to 1819. He published *Bourricorne et ses Erreurs* (2 vols. 1830), and two works on the English revolutions.

Boulder. (1.) Co. seat of Boulder co., Colorado, U.S.A., 30 m. N.W. of Denver, on Boulder Creek. There are valuable gold and silver mines in the vicinity, and oil is also found. The town has large smelting works. Pop. 6,200. (2.) Mining tn. on Coolgardie goldfield, W. Australia, about 360 m. E. by N. of Perth. Pop. 5,700; of dist. 20,000.

Boulder Clay, or TILL, a tough, unstratified clay, full of boulders, spread over wide areas of the northern hemisphere. It covers most of the low grounds of Scotland and Northern and Central England, most of N. America north of the latitude of New York; in Europe, it is largely developed in Sweden, Germany, Poland, Denmark, and Switzerland. The boulders vary in size, the largest being many yards in length; they are, in the main, striated and rounded, the scratches being parallel to their

longer axis, and they have often been carried for long distances. It is believed that the boulder clay was formed beneath the great moving ice sheets of the Glacial period. An enormous amount of detritus, arranged in layers, is contained in the Arctic ice-cap and glaciers. Should the ice melt back, this material would form a deposit closely akin to boulder clay. It is sometimes of great thickness—200 to 300 ft. in Scotland and N. America, and even 700 ft. in N. Germany. Layers of sand and irregular patches of gravel are often mixed with the clay; the latter is fine-grained, and impermeable to water, and varies in colour with the rocks from which it has been derived, but is mostly dark gray, weathering to brown. The boulder clay is, as a rule, unfossiliferous, but contains occasional layers of peat, and other deposits which have been formed during a recession of the ice-sheets, and are known as interglacial beds. The surface of the clay is rarely level, usually showing rude, rounded hummocks, known as drumlins, often with shallow, marshy pools between them. See J. Geikie's *Great Ice Age* (3rd ed. 1894) and his *Earth Lore* (1893), G. F. Wright's *Ice Age in North America* (1899), Bonney's *Ice Work* (1872), and A. Croll's *Climate and Time* (new ed. 1885).

Boulé, an advisory council in ancient Greece. The best known is the Athenian Boulé, which was at first the same as the Areopagus but under the Solonian scheme became a committee of the Ecclesia. See AREOPAGUS and ECCLÉSIA.

Boulenger, PIERRE EMMANUEL HIPPOLYTE (1838-74), Belgian painter, born in Tournay. He early took to landscape painting, and achieved for Belgian art very much what Corot did for that of France. Under his influence arose the Société

Libre des Beaux-Arts (1868), and its journal, *L'Art Libre* (1871), wherein young painters defended their methods and ideals. See Lemonnier's *Histoire des Beaux-Arts en Belgique* (1881).

Boulevard (Fr.; Ger. *bollwerk*, and Eng. 'bulwark') originally denoted the outer fortifications or ramparts of a town. The term is now applied to a broad avenue on the site of the demolished fortifications, planted with rows of trees. The boulevards of Paris are the finest in Europe.

Boulger, DEMETRIUS CHARLES (1853), founder and some time editor (1885-90) of the *Asiatic Quarterly Review*, has published several important works on Eastern subjects—e.g. *Life of Yakoob Beg of Kashgar* (1878); *England and Russia in Central Asia* (1885); *History of China* (1900); *Life of Gordon* (1896); *The Congo State* (1898); *India in the 19th Century* (1901)—*Belgian Life in Town and Country* (1904); and *The Life of Sir Halliday Macartney, K.C.M.G.* (1908).

Bouliguine, A. G. (1851), Russian administrator. He was made judge of Tambov in 1871, and in 1874 entered the ministry of the interior. In 1887 he became vice-governor of Tambov, and in 1893 governor of Moscow under Grand Duke Sergius (assassinated Feb. 17, 1905). In the same month he was appointed minister of the interior on the resignation of Prince Sviatopolk Mirsky. His name has been associated with a number of projected reforms.

Boulimia, an excess of appetite, often arising from an irritated stomach, or in the course of certain nervous disorders.

Boulogne-sur-Mer, seaside resort, dist. tn., and harbour on the English Channel, dep. Pas-de-Calais, France, at mouth of the Liane, 130 m. N.N.W. of Paris, and connected with Folkestone by a daily cross-Channel service.

The Haute-Ville, a square surrounded by ramparts built in the 13th century, occupies the hill-top on the right bank of the river. The Basse-Ville lies between the old town and the river. The quarter on the left bank is called Faubourg Capécure. The beach and the casino are on the right bank. The harbour ranks first in France for herring and cod fishing. The imports (valued at over £4,000,000 annually) consist mainly of textiles, coal, and wood; the exports (annual value over £12,000,000), of eggs and fowls, dried fish, watches, tools, textiles, leather, and wine. There are steel and iron works, saw-mills, dyeworks, soap and pen factories, and cement works. Sainte-Beuve (1804-69) and Mariette (1821-81) were born here. Boulogne, the *Gesoriacum* (later *Bononia*) of the Romans, was in the hands of the English from 1544 to 1550. In 1802 Napoleon mustered an army at Boulogne with the intention of invading Britain. Pop. 50,000.

Boulogne - sur - Seine, s.w. suburb of Paris, France, between the fortifications, the r. bk. of the Seine, and the Bois de Boulogne, the pleasure-ground of the Parisians; it has laundries and chemical works. Pop. 50,000.

Boulton, MATTHEW (1728-1809), English engineer and inventor, was born at Birmingham, and founded the Soho metal-stamping works in 1762. Seven years later he became the partner of James Watt, inventor of the steam-engine, to whom Boulton's financial assistance and practical ingenuity were invaluable. This versatile man also designed (1788) machinery adopted by the Mint, and in 1797 he contracted for a new copper issue for Great Britain. See Smiles's *Lives of Boulton and Watt* (1865); Muirhead's *Life of Watt* (1859).

Boundaries. (1.) OF LOCAL AREAS. Large powers of altering areas were given by the Local Government Acts, 1888 and 1894, to the Local Government Board and the county councils, subject, in the case of the alteration of the boundaries of counties and boroughs, to confirmation by Parliament. The powers are of too detailed a nature to be set forth here, but the general effect is to enable the parish to be treated as the unit, and all other areas to be made to coincide in boundary with one or more parishes. Similar powers were conferred upon the Scottish Local Government Board and county councils by the Local Government Acts, 1889 and 1894. (2.) OF ESTATES. In modern English conveyances the land is generally fully described, often in a schedule which refers to an annexed map or plan, and gives the names by which the fields are commonly known, the state of cultivation, the names of the tenants, and the numbers on the plan; and in this way the boundaries can be accurately ascertained. But there are certain presumptions as to boundaries in the absence of evidence of a contrary intention, which may be shortly stated. When a boundary is described as running from one point to another, it is presumed to be a straight line between them. When property is bounded by a road or a river, the middle line of the road or river is presumed to be the boundary. A hedge on the boundary line is the joint property of adjoining owners; but when a hedge and a ditch separate two properties, both the hedge and the ditch presumably belong to the owner of the property on which the hedge stands. Strips of waste land beside a highway are presumed to belong to the adjoining owners. When trees overhang a boundary line, they may be

lopped by the adjoining owner back to the line. In Scots law, a bounding charter is a conveyance in which the boundaries of the land conveyed are set out in any way by which they can be definitely ascertained. Nearly all modern conveyances state the boundaries, but large estates which have long been held undivided are conveyed by name without boundaries. The fact that boundaries are stated does not prevent incorporeal rights such as salmon fishings and servitudes from passing with the estate.

Bounds, **BEATING THE**, is the popular name in England, as 'riding the marches' is in Scotland, for the annual ceremony of perambulation round the boundaries of a township or parish on Ascension Day. With the view of keeping alive the memory of the places where the boundaries ran, it used to be sometimes customary to whip the boys of the parish school at important spots during the perambulation. The practice of 'beating the bounds' is not yet wholly obsolete in England and Scotland (e.g. in Hawick, Linlithgow, Peebles, and Selkirk). 'Common riding' and 'riding the marches' are alternative names in Scotland.

Bounty. (1.) A grant made to the producers or exporters of particular articles, and therefore the opposite of tax. The general effect of bounties is to cheapen the commodities on which they are given, while their object is the encouragement of the particular industry. Remarkable cases of the use of bounties are: the English bounties on the export of corn (1688-1814), the continental bounties on beetroot sugar, and the French bounties on shipping. In some instances bounties have arisen from drawbacks--i.e. allowances made to exporters to compensate for special taxation; and, in a wider sense, all govern-

mental assistance may be deemed a bounty. The policy of bounties is, historically, a minor part of the mercantile and protective system. See **MERCANTILISM** and **PROTECTION**; also *Wealth of Nations* (bk. iv. ch. 5); Fawcett's *Free Trade and Protection* (4th ed. 1881, ch. 2, pt. 1). For recent British policy with regard to sugar bounties, see **BRUSSELS SUGAR CONVENTION**, and **SUGAR BOUNTIES CONVENTION**. (2.) The premium or reward offered in the royal navy of Britain to seamen who, in periods of stress, may voluntarily enter the navy. At the present day the system can hardly be said to exist in the old sense. As early as 1672 it appears to have first come into existence. In 1733 a proclamation was issued recalling all British seamen from the service of foreign powers, and offering 20s. bounty for an able seaman and 15s. for a landsman. In 1770, when a war with Spain was threatened, a bounty of £2 was offered; and, in addition to this, numbers of towns and cities voluntarily offered municipal bounties: for instance, London £2, Bristol £1, Edinburgh £2, 2s. to able, and £1, 1s. to ordinary, seamen; and so on. In 1795 an act was passed in pursuance of which each county had to furnish a proportionate number of men for the navy; and these were called 'quota men.' The quota bounty grew to an excessive amount--in one case to as much as £70. See **CONTINUOUS SERVICE**. (3.) **BOUNTY MONEY**. The Naval Agency and Distribution Act, 1864, provides for the appointment of a ship's agent to receive and distribute bounty to the officers and crew of a ship of war in respect of salvage services, penalties in respect of the breach of the merchant shipping laws, penalties under the customs laws, under the Slave Trade Acts, in respect of piracies, and for cap-

ture of foreign ships in time of war. Where a slave ship is captured by one of the King's ships, a bounty of £5 a slave or £4 a ton is payable to the crew under the Slave Trade Act, 1873. Bounties are also paid for enlistment in the special reserve.

Bounty, MUTINY OF THE. On Dec. 23, 1787, H.M.S. *Bounty*, under the command of Lieut. William Bligh, left Spithead for the South Seas. The ship arrived at Tahiti in October 1788, and weighed on her return in April 1789. Bligh was tyrannous and unjust to his crew, and unable to stand his severity any longer, they, under the leadership of Fletcher Christian, seized him on April 28, and put him and those who remained loyal to him—eighteen in number—into the launch, and turned them adrift. Bligh ultimately reached Batavia, making a voyage of 3,618 miles without the loss of a life by sickness. The mutineers returned with the *Bounty* to Tahiti, and most of them settled there; but a few who feared capture sailed (1790) to Pitcairn Island. This party included nine British sailors, six native men, and twelve native women. The native women killed the native men; and after eighteen years only one Englishman, John Adams, survived. He had organized a prosperous and peaceful miniature colony. Of the mutineers who stayed at Tahiti, twelve were captured by the *Pandora*, Captain Valentine Edwards, and three were hanged. The fate of the party which had colonized Pitcairn Island remained unknown till 1808, when the island was visited by an American vessel, the *Topaze*. John Adams, who was never proceeded against, died in 1829. See Barrow's *Mutiny of the Bounty* (new ed. 1886); Beechey's *Voyage to the Pacific* (1831); Belcher's *The Mutineers of the Bounty* (1870);

Bligh's *Hist. of the 'Bounty's' Voyage* (1790); 'Journal of Gunner James Morrison,' cited in Marshall's *Naval Biography*, ii.

Bounty, QUEEN ANNE'S. See QUEEN ANNE'S BOUNTY.

Bourbaki, CHARLES DENIS SAUTER (1816-97), French general, born at Pau; served in Algeria, and distinguished himself in the Crimea (1854) and in Italy, especially at Solferino (1859). On the outbreak of the Franco-German war he was in command of the Guards, and fought in the battles round Metz (1870). Although captured with that fortress, he was allowed to go, or escaped, to England on a mission to the Empress Eugénie. Then he took command of the Army of the Loire, but was driven into Switzerland by Manteuffel (January 1871). He retired from the army in 1881. See *Lives* in French by Grandin (1897), Félix (1898), and Bournaud (1899).

Bourbon, ISLE. See RÉUNION.

Bourbon, CHARLES, DUO DE BOURBON (1490-1527), known as 'Constable de Bourbon,' assumed the title of the Duc de Bourbon on his marriage in 1505 to Suzanne, daughter and heiress of Pierre, Duke of Beaujeu, the last male representative of the elder line of the Bourbons. His royal blood, great military talents, and his personal bravery, especially at Agnadello and Marignano in 1515, induced Francis I. of France to make him constable of the kingdom, the highest military officer in France, when only in his twenty-sixth year. Embroiled in a lawsuit with the Duchess of Angoulême, mother of Francis I., he formed a conspiracy against the latter, and upon its detection fled to Italy and entered the service of Charles V. in 1523. He distinguished himself at Sesia (1524), and at the battle of Pavia (1525), in which Francis I. was taken prisoner. Being unable to pay his troops, he attacked

Rome with the object of plunder on May 6, 1527, and, being the first to mount the walls, was killed by a random shot, which Benvenuto Cellini asserts was fired by himself. The constable was buried at Gaeta. See Deppeyre, *Les Ducs de Bourbon* (1897), and *Life* by C. Hare (1910).

Bourbon Family, the name of a dynasty which reigned over France from 1589 to 1792, and from 1815 to 1848. The name was derived from the castle of Bourbon, in the old province of Bourbonnais. The founder of the family was Robert (d. 1317), Count de Clermont, son of King Louis IX. His son Louis (1279-1341) was the first Duke of Bourbon, and fought against the English for Charles le Bel. Pierre (1310-56), the second duke, was killed at the battle of Poitiers. His son Louis (1337-1410), third duke, was one of the most powerful vassals of the crown of France, and made large additions to the duchy. When Charles V. concluded a peace with England, the duke was appointed guardian to the young Duke of Orleans. He was succeeded by his son Jean I. (1381-1434), who was taken prisoner by the English at the battle of Agincourt, and detained till his death in London. His son, Charles I. (1401-56), defended Orleans against the English. His son, Jean II. (1426-89), distinguished himself in the wars against the English, joined the Duc de Bretagne in the league against Louis XI., and in 1483 became constable of France. The seventh duke was Charles (1437-88), Cardinal de Bourbon, and brother of Jean II. He was a diplomatist, and a favourite counsellor of Louis XI. The last and the greatest of the eldest branch of the Bourbons was Charles, 'the Constable.' (See above.)

Among the collateral branches of the Bourbon family were those

of Vendôme, Condé, Montpensier, Orleans, Conti, and Soissons. Antoine de Bourbon (1518-62), Duc de Vendôme, became king of Navarre by marriage (1548) with Jeanne d'Albret. His son, Henry of Navarre, was the first French king of the house of Bourbon, as Henri IV. (See HENRI IV.) His two sons were Louis XIII. and Gaston, Duc d'Orléans; one of his daughters, Elizabeth, married Philip IV. of Spain, and the other, Henrietta, became the queen of Charles I. of England. Louis XIII. left two sons—Louis XIV., and Philip, Duc d'Orléans, who was the ancestor of King Louis Philippe. The eldest son of Louis XIV. died in 1711, leaving three sons, the eldest of whom died in the following year—his eldest son, Louis, succeeding (as Louis XV.) his great-grandfather, Louis XIV., in 1715. Louis XV.'s eldest son also died before his father, and his three sons reigned in succession as Louis XVI., Louis XVIII., and Charles X. Louis XVII., the only surviving son of Louis XVI., died (1795) in prison in the Temple, the second grandson of Louis XV. succeeding as Louis XVIII.; upon whose decease (1824), without issue, the third grandson, Charles, succeeded as Charles X., but was forced to abdicate in consequence of the revolution of July 1830. Charles X.'s grandson, Henri, Count de Chambord, was styled by the Legitimists Henri V.

The younger branch of the Bourbons is the house of Orleans, whose descent starts from Philip of Orleans, brother of Louis XIV. His son Philip, 'The Regent Orleans,' who governed France during the minority of Louis XV. (1715-23), was great-grandfather of Louis Philippe, known to the revolutionists as 'Citoyen Egalité,' and the latter's son Louis Philippe became king of the French in 1830, and was dethroned in 1848. On his

death, his sons, the Duc d'Orléans, the Duc de Nemours, the Prince de Joinville, the Duc d'Aumale, and the Duc de Montpensier, became the representatives of the house of Bourbon. The first named had two sons, known as the Comte de Paris and the Duc de Chartres. The present head of the house of Orleans is Prince Louis Philippe Robert, born 1869.

Philip, Duke of Anjou, the second of the three sons of the Dauphin (eldest son of Louis XIV.), and brother of Louis, Duke of Burgundy (father of Louis XV.), became (1700) Philip V. of Spain, under the will of Charles II. The reign of the family was cut short by the dethronement of Queen Isabella in 1868; but in 1875 the dynasty was restored in the accession of Alfonso XII., whose son, Alfonso XIII., is now the Spanish sovereign. Philip was also ancestor of the Bourbon dynasties of Naples and Parma, both of which are extinct. The last king of Naples was Francis II., who had to flee (1860) before the troops of Garibaldi; while Parma was incorporated with the kingdom of Italy in 1859. The last of its dukes were Charles III., who was assassinated in 1854, and his son, Robert I. See Achaintre, *Histoire Chronologique et Généalogique de la Maison Royale de Bourbon* (1825); Dussieux, *Généalogie de la Maison de Bourbon* (Paris, 1869); Bingham, *Marriages of the Bourbons* (1889); Depeyre, *Les Ducs de Bourbon* (1897); and Coxo, *Memoirs of the Kings of Spain of the House of Bourbon* (1813). See ORLEANS, DUKE OF.

Bourbonnais (*Borbonensis Ager*), former province in centre of France, divided into Sologne Bourbonnaise and Limagne Bourbonnaise. Its capitals were successively Bourbon l'Archambault and Moulins. It was formed into the department of Allier and parts

of departments of Cher, Puy-de-Dôme, and Creuse. See Nicolay's *Description et Histoire du Bourbonnais* (1875).

Bourbonne-les-Bains, health resort and dist. th., dep. Haute-Marne, France, 30 m. S.E. of Chaumont; has hot mineral springs (122°-138° F.) known from Roman times. Pop. 4,000.

Bourboule, La, health resort, dep. of Puy-de-Dôme, France, on upper reach of the Dordogne (alt. 2,790 ft.). 24 m. S.W. of Clermont, with hot-water spring (81°-129° F.). Pop. 2,000.

Bourchier, ARTHUR (1864), British actor, founder of the 'O.U.D.S.' at Oxford, where he played Shylock, Falstaff, and other parts. In 1889 he joined Mrs. Langtry's company at Wolverhampton, as Jaques in *As You Like It*, and afterwards played the same part at the St. James's Theatre. He also toured with Miss Fortescue; then played with Sir Charles Wyndham (Charles Courtly in *London Assurance*, and Joseph Surface), with Daly's company, with Sir John Hare in *Money*, and in 1894 took the leading part in *The Derby Winner* at Drury Lane. In the same year he married Miss Violet Vanbrugh, and, with her, took important parts under Sir John Hare's management; and in the autumn of 1895 himself undertook managerial responsibilities at the Royalty, producing *The Child Widow* and *The Queen's Proctor*. Having toured (1896) Britain and the United States, Bourchier opened the Camberwell with *A Marriage of Convenience*, and played in *22a Curzon Street*. Later parts were in G. P. Bancroft's *Teresa*; *Brother Officers*; *Wheels within Wheels*; Dr. Johnson in Wyndham's *David Garrick and Dr. Johnson*; *His Excellency the Governor*; and, at the Garrick, Barrie's *The Wedding Guest*. In 1903 he played in

The Bishop's Move, *The White-washing of Julia*, and *The Golden Silence*, at the Garrick. In 1904 he produced *The Arm of the Law*, an adaptation of Brioux's *La Robe Rouge*, playing the part of the Judge with great power; and *The Walls of Jericho*, a successful play by A. Sutro. In 1905 he played as Shylock, and in 1907, 1908, and 1909 he appeared in *Mr. Sheridan*, *The Duel*, *The Man and the Boy*, *Her Father*, *John Hayde's Honour*, *Making a Gentleman*, *The Knife*, *The Tenth Man*, *Glass Houses*, and as Henry VIII. in Shakespeare's play. He has adapted several continental plays for the English stage.

Bourdalone, LOUIS (1632-1701), member of the Society of Jesus (1648), was successively professor of humanity, rhetoric, and philosophy and moral theology at the Jesuit College of Bourges, his native town. From 1659-69 he preached in the provinces. In 1669 he came to Paris, where he obtained a very high reputation. After the revocation of the Edict of Nantes he went (1686) to Languedoc, to convert the Protestants, and on his return became for a time confessor to Madame de Maintenon. His later years were devoted to visiting the sick and the poor. His simple, earnest, and fearless character gave him a great influence over all classes. As a preacher he excelled in the orderly treatment of his theme, in logic, and in acute psychological analysis. His scientific and didactic methods made him the least ornate of orators, but his intense earnestness heightened his eloquence. Though not rising to the sublimity of Bossuet, he was, as Voltaire called him, 'the first model of good preachers in Europe.' *Works*, P. Bretonneau (16 vols. 1707-34), Lefèvre (3 vols. 1838-4); *Life*, by Lauras, in French (1881), and by Castets (1901).

Bourdon de l'Oise, FRANÇOIS LOUIS (c. 1750-97), a French revolutionist; born near Compiègne. He assisted in storming the Bastille (1792), and in forming plans for the execution of the king and the Girondists. But he joined the enemies of Robespierre on the 9th Thermidor, and was one of the party chiefly responsible for his downfall. Elected to the Council of Five Hundred, he afterwards opposed the republicans, and for his royalist tendencies was transported (1797) by the Directory to Cayenne, where he died. See Thiers's *Hist. de la Révolution Française* (new ed. 1882).

Bourg-en-Bresse, cap. of dep. Ain, France, 35 m. by rail N.N.E. of Lyons; an important railway junction; contains the church of Notre Dame de Brou (1511-36), with fine tombs of Philibert, Duke of Savoy, his mother Margaret of Bourbon, and his wife Margaret of Austria. It is known to the English-reading world from Matthew Arnold's poem (*cf.* Edgar Quinet, *Œuvres Complètes*, vol. viii., ed. 1857-79). The town has monuments to General Joubert, Bichat, and Quinet. Bourg has manufactures of jewellery, copper ware, pottery, and artificial mineral waters; a considerable trade is done in corn, cattle, horses, and the 'volaille de Bresse.' Here were born Edgar Quinet (1803) and Lalande (1732). Pop. 20,000.

Bourgeois, LÉON VICTOR AUGUSTE (1851), French statesman; born in Paris; became minister of the interior (Tard cabinet) in 1890, and of public instruction (Freycinet cabinet), 1890-2. In the Loubet cabinet he was minister of justice (1893), then president of the Chamber of Deputies (1894); and in 1895 he himself formed a cabinet, in which he was minister of the interior, and later of foreign affairs (till 1896). In the Brisson cabinet of 1898

he was minister of public instruction, and did much for the organization of elementary and secondary schools. In 1902 he was again elected president of the Chamber of Deputies, in 1906 he became minister of foreign affairs in Sarrien's cabinet, and in 1907 he was first French delegate at the Hague Conference. He has published several educational works.

Bourgeois, SIR PETER FRANCIS (1756-1811), English painter; born in London. He was encouraged in his choice of a profession by Reynolds and Gainsborough; studied under De Loutherbourg; and early acquired a reputation as a landscape painter. Stanislaus, king of Poland, gave him an appointment (1791), and knighted him. He was appointed landscape painter to George III. (1794), and R.A. (1793). He left his valuable collection of 371 pictures to Dulwich College. Among his principal works are *Kemble as Coriolanus*, *Hunting a Tiger*, *Tobit and the Angel*, and a portrait of himself.

Bourgeois. See TYPES.

Bourgeoisie (literally, the class of 'burghesses' or citizens of towns) is a French expression, generally used contemptuously by the aristocratic, labour, proletariat, socialist, artistic, and 'intellectual' classes for what they conceive to be a mean, philistine, and selfish breed of capitalists, shopkeepers, and professional men, whose only ideals are a certain sordid comfort, petty ostentation, and a grotesque respectability.

Bourges, *tn.*, formerly cap. of prov. Berry, now of dep. Cher, France, 144 m. by rail s. of Paris, on a plateau not far from the geometrical centre of France. It is the seat of an archbishop, the headquarters of the 8th Army Corps, and has a large arsenal. Among the objects of historical interest are remains of a Roman

wall, the cathedral of St. Etienne (one of the finest churches of France, dating from 1182), the churches of Notre Dame, St. Pierre, and St. Bonnet. The town has flour mills and breweries, and manufactures cloth, leather, and cutlery. Caesar destroyed it (52 B.C.), but Augustus made it the capital of Aquitania. It is notable for the mediæval struggle between the Duke of Berry and the archbishop. Owing to its central position it has often been chosen as a meeting-place of councils, seventeen in all, of which the most important was held in 1438; it asserted the independence of the Gallican Church by an instrument known as the 'Pragmatic Sanction.' Louis XI. (1423) and the preacher Bourdaloue (1632) were born here. Pop. 44,000.

Bourget, *LE*, *tn.*, 4 m. N.E. of Paris, France. Here, on Oct. 28 and Dec. 21, 1870, were fought battles in which the Prussians were victorious. Pop. 3,000.

Bourget, PAUL CHARLES JOSEPH (1852); born at Amiens, member of the French Academy (1894), and one of the most successful of contemporary novelists and critics. He became, in 1873, a contributor to the *Revue des Deux Mondes*, the *Renaissance*, the *Parlement*, and the *Nouvelle Revue*. His first separate publications were in poetry--*La Vie Inquiète* (1875), *Edel* (1888), *Les Aveux* (1882). In 1885 he issued a novel, *Cruelle Enigme*, which at once made his reputation. Since then he has published a great number of novels, and with these has alternated studies in criticism, written in the urbane but not very vigorous style which marks most of the French writers who have formed their prose on that of Renan. Several of these were collected in the volume styled *Essais de Psychologie contemporaine* (1884), in which he gave appreciations of Renan,

Baudelaire, Flaubert, and Taine; a second series (Dumas fils, Leconte de Lisle, the Goncourts, Tourgénéiev, Amiel) appeared in 1885. Of late years M. Bourget has published some volumes of travel, of which his *Outre-Mer* (*Voyages en Amérique*), in 1895, is the best known. Probably his best novel is *Le Disciple* (1889), which contains the elements of fine tragedy. Of late, since *Cosmopolis* was published (1892), M. Bourget has seemed to take special pleasure in depicting the mixed society of all nations to be met with in Rome or on the Riviera. Publications (in addition to those already named): *Etudes et Portraits* (1888), which contains his reminiscences of a visit to England and Ireland; *Sensations d'Italie* (1891); *Psychologie de l'Amour moderne* (1891). Novels, etc.: *Un Crime d'Amour* (1886); *Mensonges* (1887); *L'Irreparable* (1888); *André Cornélis and Pastels* (1889); *Notre Cœur, Un Cœur de Femme*, and *Nouveaux Pastels* (1890); *La Terre Promise and Cosmopolis* (1892); *Un Scrupule* (1893); *Un Saint* (1894); *Une Idylle Tragique* (1896); *Recommencements* (1897); *Complications Sentimentales*, *La Duchesse Bleue*, *Drames de Famille*, and *Voyageuses* (1898); *Trois Petites Filles* (1899); *Un Homme d'Affaires* (1900); *Le Fantôme* (1901); *Monique and L'Étupé* (1902); *Un Divorce* (1904); *Les Deux Sœurs* (1905); and *L'Émigré* (1907). A collected edition of his works in 12 vols. began to appear in 1900.

Bourgoin, tn., Isère dep., France, 25 m. S.E. of Lyons. Pop. comm. 7,200.

Bourguignons—i.e. BURGUNDIANS—the name of a political party in France, which, during the civil war (1410-35), was opposed to the Armagnacs. They were so called from their chief, John the Fearless, Duke of Burgundy (Bourgogne), and represented the

popular party, being supported by the bourgeoisie of the big towns in the north of France. The struggle between these parties was ended by the treaty of Arras (1435), concluded between Charles VII., king of France, and Philip the Good, Duke of Burgundy.

Bourignon, ANTOINETTE (1616-80), a French 'visionary,' and founder of a sect called by her name, was born at Lille. To avoid a marriage, she fled from her father's house; and on her father's death (1648) she became head of a hospital in Lille (1653-62). After that she proceeded to Holland and the north-west of Germany. The leading idea of her system was that religion consists in elevated emotion, not in knowledge and practice. The Bourignonists spread from Holland to Germany, France, Switzerland, and even to Scotland (early 18th century), and held a position not unlike that of the Swedenborgians in later times. An edition of Bourignon's tracts (19 vols.) was published in Amsterdam (1686), to which is prefixed her *Life*. Three of these were translated into English—*Treatise of Solid Virtue* (1699), *Restoration of the Gospel Spirit* (1707), and *An Abridgment of the Light of the World* (1786). See *Antoinette Bourignon, Quietist*, by A. R. MacEwen, D.D. (1909).

Bourinot, SIR JOHN GEORGE (1837-1902), historian, became clerk to the Canadian House of Commons in 1880; he was created K.C.M.G. in 1898. He published *Canada* ('Story of the Nations Series,' 1885); *How Canada is Governed* (1895); *Parliamentary Procedure and Government in Canada* (1884); *Cape Breton and its Memorials of the French Régime* (1892); *Builders of Nova Scotia, Canada, under British Rule* (Cambridge Hist. Series; new ed. 1901); *Constitutional History of Canada* (new ed. 1901).

Bourke, tn., Cowper co., New South Wales, on s. bk. of Darling R., 500 m. by rail N.W. of Sydney; has meat-preserving works. Pop. 2,600.

Bourke, RICHARD SOUTHWELL. See MAYO, EARL OF.

Bourmont, LOUIS AUGUSTE VICTOR DE GHAISNES, COMTE DE (1773-1846), and marshal of France, was born in the department of Maine-et-Loire. He became an officer of the French Guards, and in 1791 fought on the side of the royalists. He took a prominent part in the civil war in La Vendée, but on his return to Paris in 1799 incurred Napoleon's suspicion, and was imprisoned. After his escape he became reconciled to Napoleon, and served (1808-15) with distinction in Naples, Russia, and Germany. On Napoleon's flight from Elba he was appointed to a division, but subsequently joined the Bourbons, and in 1823 was appointed commander of the army sent into Spain. On his return to France he was created a peer. In 1829 he became minister of war. He commanded in the invasion of Algeria (1830), for which service he was promoted to the rank of marshal. But he declined to take the oath of allegiance to Louis Philippe (1830), and lived for some time in England.

Bourne, par. and tn., Lincolnshire, England, near the Fens, 9 m. W. of Spalding. The house in which the Gunpowder Plot was hatched is preserved in its old condition. It was the birthplace of Lord Burghley. Pop. 4,400.

Bourne, EDWARD GAYLORD (1860), American historian, was born at Strykersville, New York; lectured on political science at Yale (1886-8); was professor of history at Cleveland (1888-95), and at Yale (from 1895). He has written *Essays in Historical Criticism* (1901); *Spain in Amer-*

ica (1904); *Life of J. L. Motley* (1905); *The Voyages of Champlain* (1905); and *Narratives of Columbus and Cabot* (1906).

Bourne, FRANCIS (1861), Roman Catholic archbishop of Westminster, head of the Roman Catholic Church in England. Successively priest at Blackheath, Mortlake, and W. Grinstead, in 1889 he founded and became head of an ecclesiastical seminary for the diocese of Southwark. In 1895 he was made domestic chaplain to the Pope, and in 1897 bishop of Southwark. In August 1903, on the death of Cardinal Vaughan, he succeeded to his present office.

Bourne, HUGH (1772-1852), founder of the Primitive Methodists, was a carpenter and builder; became local preacher among the Wesleyan Methodists, and in 1802 built a chapel at Harriseahead, near Newcastle-under-Lyme. In 1807 he began to hold large camp meetings for the revival of religion; and though conference the same year passed a resolution condemning such meetings, Bourne continued to hold them, the result being his summary expulsion from the society (1808). Only when convinced that his expulsion was final did Bourne proceed to establish a new denomination. The first general meeting of the new society was held at Tunstall, July 26, 1811; the name, 'Primitive Methodists,' was adopted, February 13, 1812; and the first annual conference was held at Hull, May 1820. Before Bourne's death the Connexion had developed into a membership of 110,000. See J. Walford's *Memoirs of H. Bourne* (1855); J. Petty's *Primitive Methodist Connexion* (new ed. 1864).

Bourne, VINCENT (1695-1747), Latin poet, became a master at Westminster, where Cowper was one of his pupils, and in 1734 was appointed deputy serjeant-

at-arms to the House of Commons. His *Poëmata* appeared in 1734. Translations from his verse appear in Cowper and Lamb. See his *Poëmata*, ed. by Mitford, with *Memoir* (1840).

Bournemouth, wat.-pl., munic. and co. bor. on the S. coast of England, on Poole Bay, with four stations on the L. & S.W.R., 4 m. W. of Christchurch, Hampshire. Originally a small fishing village, it was not until the middle of the 19th century that it came into notice as a health resort. It was incorporated in November 1890. Its position on the coast and in the pine-sheltered valley traversed by the Bourne, its equable climate, its fine stretch of sand, its magnificent views, especially from W. Cliff, and its public parks and pleasure grounds, make it an ideal seaside resort. Within recent years it has inaugurated carnivals similar to those on the Riviera. It is beneficial to consumptive patients, and there are numerous hospitals and homes. Pop. 75,000.

Bournville, model vil., England, 4 m. S.W. of Birmingham, formed in 1895 by Mr. George Cadbury of cocoa fame. The area of the vil. is over 500 acres, and it has a pop. of 3,000.

Bourrée, a dance said to be of French or Spanish origin. As a musical form the *bourrée* is always in alla-breve time, and is frequently found in the works of the older composers, such as the *suites* of Bach.

Bourrienne, LOUIS ANTOINE FAUVELET DE (1769-1834), French diplomatist, born at Sens, was a fellow-student of Napoleon at Brienne, and in 1797 became confidential secretary to Napoleon. He was dismissed in 1802 by Bonaparte, on a charge of peculation; and in 1814 he deserted the cause of his former patron for that of Louis XVIII., by whom, in 1815, after Waterloo, he was appointed

minister of state. The loss of his fortune at the time of the revolution of 1830 affected his reason, and he spent the last two years of his life in an asylum at Caen. His *Mémoires* appeared in 1829-31 (new ed. 1899-1900), and caused a sensation for their Napoleonic details. But they are unreliable, and their mistakes were exposed by Boulay de la Meurthe in *Bourrienne et ses Erreurs Volontaires et Involontaires* (1830).

Bourrit, MARC THÉODORE (1735-1815), Swiss artist and author; born at Genoa. His life was devoted to the Alps. He was the first to attempt the ascent of Mont Blanc (1784), but failed to reach the summit; and did much to make Chamonix known. His chief works are *Description des Glacières* (1773; Eng. trans. 1776), *Description des Alpes Pennines et Rhétiennes* (1781), and *Description des Cols ou Passages des Alpes* (1803). See Durier's *Le Mont Blanc* (4th ed. 1897); and Mr. Douglas Freshfield in the *Alpine Journal*, vol. ix. 1879, pp. 11-24.

Bourse, the continental name for a stock exchange or money market, of which the most important are those at Paris, Berlin, and Vienna. The Paris Bourse is a handsome Grecian building with Corinthian pillars, designed by Alex. Théod. Brongniart (1813), and completed by Labarre in 1827. See STOCK EXCHANGE.

Bousa, Abyssinian millet beer.

Bouscat, LE, *tu.*, dep. Gironde, France, 3 m. N.W. of Bordeaux, of which it is a suburb; has a hydropathic establishment. Pop. 10,500.

Boussa, BUSSA, or BUSSANG, *tu.*, N. Nigeria, on the Niger, 55 m. W.N.W. of Zungeru. Here, in 1806, Mungo Park met his death. Pop. 12,000.

Boussingault, JEAN BAPTISTE JOSEPH DIEUDONNÉ (1802-87), French chemist, who, after trav-

elling in company with Bolivar the Liberator through Colombia, Peru, and Venezuela, became professor of chemistry at the Sorbonne in Paris (1839). He carried on investigations into the composition of the atmosphere, and studied poisons; but his most important work was in agricultural chemistry. See his *Economie Rurale* (1844; Eng. trans. 1845; newer ed. in 8 vols. 1860-91).

Boussu, tn., prov. Hainault, Belgium, 7 m. by rail w. of Mons; has coal mines, copper and iron foundries, engineering and boatbuilding works. Pop. 11,500.

Boutell, CHARLES (1812-77), British archaeologist, was born at St. Mary Pulham, Norfolk; successively rector of Downham Market (1847-50), and vicar of St. Mary Magdalen, Wiggenshall, Norfolk (1850-5). He was a founder (1855) of the London and Middlesex Archaeological Society, and published *Monumental Brasses and Slabs of the Middle Ages* (1847), *A Manual of British Archaeology* (1858), *Heraldry, Historical and Popular* (1863), and other cognate works.

Bouterwek, FRIEDRICH (1765-1828), German philosopher, poet, and critic, was appointed professor of philosophy at Göttingen in 1797. He wrote *Ideen zu einer allgemeinen Apodiktik* (1799), and *Asthetik* (1806), but is remembered chiefly for his *Geschichte der neuern Poesie u. Beredsamkeit* (1801-19).

Bouts, DIERICK (d. 1475), also called STUERBOUTD and THIERRY DE HAARLEM, Dutch painter, was probably Van der Weyden's pupil. He was appointed municipal painter at Louvain about 1468. His manner is rather stiff; his personages are imposing, with long heads and fixed expressions. Among his works are *The Judgment of the Emperor Otho* (Brus-

sels), *Martyrdom of St. Erasmus*, and *Last Supper* (St. Pierre, Louvain—the wings of this are in the Berlin and Munich galleries); Vienna and Bruges also have pictures by him. The *Exhumation of Bishop Hubert*, in the National Gallery, London, has been ascribed to him. See F. T. Kugler's *Handbook of Painting: Dutch, German, and Flemish Schools* (new ed. 1879).

Bouts-rimés (Fr. 'rhymed ends'), a poetical amusement, very popular in French literary circles in the 17th and 18th centuries, in which the rhymes of a poetical composition are prescribed in their due order, and the contestants are required to compose verses to suit them. Alex. Dumas published a collection of *bouts-rimés* in 1865. See Addison's *Spectator*, No. 60.

Boutwell, GEORGE SEWALL (1818-1905), American lawyer and statesman, was born at Brookline, Massachusetts; governor of Massachusetts (1851-3); organized the new department of internal revenue (1862); was a member of Congress (1863-9); and was one of the seven who conducted the impeachment of President Johnson (1868). During Grant's presidency he was secretary of the Treasury (1869-73), and a senator for Massachusetts (1873-7). He was the author of *Educational Topics and Institutions* (1858); *Manual of the United States Direct and Revenue Tax* (1863); *Why I am a Republican: History of the Republican Party* (1884); *The Lawyer, the Statesman, and the Soldier* (1887); and *Reminiscences of Sixty Years* (1902).

Bouvardia (named after Bouvard, physician of Louis XIII.), a genus of plants of the Rubiaceæ. They are natives of Mexico; possess a tubular, four-lobed corolla with four stamens; and the fruit consists of a two-celled

capsule. They are half hardy in Britain, where they are cultivated for their showy, mostly orange or red, flowers.

Bouvines, vil., dep. Nord, France, 6 m. s.e. of Lille. Here in 1214 Philip Augustus of France defeated the combined forces of the Emperor Otho IV., the Count of Flanders, and John, king of England. Pop. 600.

Bouzas, seapt., Pontvedra prov., Spain, 7 m. s.w. of Vigo. Pop. 8,000.

Bovate, or OXGANG, an early English measure of land, was equal to half a 'virgate' or 'husband-land,' and to one-eighth of the 'hide' or 'carucate.' The extent, as much as an ox could plough in a year, varied from 8 to 24 acres. A carucate was the plough-land of a team of eight. Eight carucates made a knight's fee. See F. Seeböhm's *English Village Community* (1883).

Boves, tn., Italy, prov. of and 4 m. s. of Cuneo; with iron mines and marble quarries. Pop. comm. 10,000.

Bovey Tracey Beds, at Bovey Tracey in Devonshire, England, are known for their lignite or brown coal, which has been worked for nearly two centuries. These beds contain occasional traces of plant remains, but there are no marine fossils in this series, which was evidently deposited in a fresh-water lake. The flora resembles that of the Bournemouth leaf-beds. The Bovey Tracey beds are in all about 400 ft. thick, and are ascribed by some geologists to the Eocene, by others to the Oligocene system. See Gardner's *Q. J. Geol. Soc.*, 35 and 38; H. B. Woodward's *Geol. of Eng. and Wales* (1887); and Jukes-Browne's *Stratigraphical Geol.* (1902); also the same author in *Geol. Mag.* (1910).

Bovidae (forms 'like oxen'), a family of mammals which includes all the hollow-horned ru-

minants, and therefore the most specialized types of the artiodactyle ungulates. The members of the family are commonly known as antelopes, sheep, goats, and oxen, but the different types are not very sharply separated from one another. They show their specialization in the development of horns, in the complex stomach which makes the act of rumination possible, in the nature of the teeth, and in the structure of the limbs. The family is widely distributed, but it is a remarkable fact that no hollow-horned ruminant is indigenous to S. America, though those introduced by Europeans have thriven amazingly, and become half wild. See CATTLE.

Bovill, SIR WILLIAM (1814-1873), English judge, specially noted for his decisions in commercial cases. He was Solicitor-General in 1866, and appointed Chief Justice of the Common Pleas in the same year. The Partnership Law Amendment Act (1865), which he helped to pass, is often known as Bovill's Act.

Bovino, tn. and episc. see, prov. Foggia, Italy; stands on a spur of the Apennines, 21 m. s.w. of Foggia. Pop. 7,800.

Bow. See ARCHERY.

Bow. See VIOLIN.

Bow, or STRATFORD-LE-BOW, suburb of London. See LONDON.

Bowden, S. Australia, a suburb of Adelaide. Pop. 2,600.

Bowdich, THOMAS EDWARD (1791-1824), African traveller; born at Bristol, England; conducted a mission to Ashanti (1816), and was the first to open up that part of the interior of Africa. He set out on a second expedition in 1822, but died of fever at Bathurst, on the Gambia. Of his works we may mention his *Mission from Cape Coast Castle to Ashanti* (1819), *Discoveries of the Portuguese in Angola and Mozambique* (1824), and the *Description of the Is-*

land of Madeira, published in 1825 by his wife.

Bowditch, NATHANIEL (1773-1838), American astronomer and mathematician, was born at Salem, Massachusetts; and during a strenuous youth, in which he was a cooper, ship-chandler, clerk, supercargo, and shipmaster, he devoted himself to the study of practical mathematics. Refusing the offer of a professorship at Harvard, he became actuary (1823) to an insurance company. He published a *New American Practical Navigator* (1802), and a translation of Laplace's *Mécanique Céleste* (1829-38). See *Life* by his son, Henry I. Bowditch (1839).

Bowdler, THOMAS (1754-1825), editor of the expurgated Shakespeare, practised as a physician, and devoted himself subsequently to philanthropic work in London, the Isle of Wight (1800-10), and Rhyddings, near Swansea. Bowdler's reputation depends on his '*Family Shakespeare in ten volumes; in which nothing is added to the original text; but those words and expressions are omitted which cannot with propriety be read aloud in a family*' (1818)—a work whose method has given us the term 'to bowdlerize' (first used in General Perronet Thompson's *Letters of a Representative to his Constituents*, 1836).

Bowel. See **INTESTINES**.

Bowell, HON. SIR MACKENZIE (1823), sometime prime minister of Canada, was born at Rickingham, Suffolk, England, and emigrated with his parents to Canada in 1833. He was member for N. Hastings, Ontario, at Ottawa for twenty-five years from 1867, and was then called to the Senate, having served as minister of customs for thirteen years, and afterwards as minister of militia. On the death of Sir John Thompson (1894) he became premier, but, failing to settle the Manitoba school question, resigned in April

1896. After the defeat of the Conservatives in that year he led the opposition in the Senate. In later days he declared himself independent. He received a K.C.M.G. in 1895.

Bowen, CHARLES SYNGE CHRISTOPHER, BARON (1835-94), English lawyer and judge, was born at Wollastone, Gloucestershire, and called to the bar at Lincoln's Inn in 1861. He was appointed junior standing counsel to the Treasury in 1872, and appeared in the 'Tichborne case'; a judge of the Queen's Bench (1879); a judge of the Court of Appeal (1882); and a lord of appeal in ordinary (1893). He was a great lawyer, but an even more brilliant wit. He published *The Alabama Claim and Arbitration considered from a Legal Point of View* (1868); *Virgil in English Verse: Eclogues and Aeneid i.-vi.* (1887). See Sir Henry Stewart Cunningham's *Lord Bowen* (1896).

Bowen, FRANCIS (1811-90), American philosophic writer; born at Charlestown, Massachusetts; was lecturer on philosophy and political economy at Harvard, and afterwards (1854) professor of natural religion there; editor of the *N. American Review* (1843-54); and author of *American Political Economy* (1870), *Modern Philosophy* (1877), *Gleanings from a Literary Life* (1880), etc.

Bowen, SIR GEORGE FERGUSON (1821-99), British colonial governor, was born in Ireland. He was chief-secretary to the government in the Ionian Islands (1854-9), and was successively governor of Queensland (1859-67), New Zealand (1868-72), Victoria (1873-9), Mauritius (1879-82), and Hong-kong (1883-7). He was knighted in 1856. His works include *Ithaca in 1850* (1850; 3rd ed. 1854), which he identified with the Ithaca of the *Odyssey*; *Mount Athos, Thessaly, and Epirus* (1852); *Imperial Federation* (1886); and

Murray's *Handbook for Travellers in Greece* (1854; 7th ed. 1900). See his *Thirty Years of Colonial Government* (1889).

Bowen, RICHARD (1761-97), British naval officer, was born at Ilfracombe; in 1781, on board the *Foudroyant*, he participated in the capture of the *Lively* and the *Pégase*. He distinguished himself in the attack on Port Royal, Martinique, by leading the boats which captured the *Bienvenu* on February 17, 1794. He was consequently made commander, and within another month was posted. As captain of the *Terpsichore* he relieved the garrison of Fort Mathilde in the Guadeloupe operations in 1794, and received a wound. In 1798, still in the *Terpsichore*, he captured the *Mahonca* and several other prizes, and later in the year took the *Vestale*, a frigate in all respects more formidable than his own. After the battle off Cape St. Vincent in 1797, Bowen and the *Terpsichore* gained further glory by engaging single-handed the huge Spanish four-decker *Santisima Trinidad*, which had escaped from that action. Bowen then joined Nelson for the bombardment of Cadiz and the ill-starred attack on Santa Cruz, where he was shot dead.

Bower, ARCHIBALD (1686-1766), British ecclesiastical historian; born near Dundee; was educated at Douay and at Rome, where he joined (1706) the Society of Jesus. He then served (1723-6) in the Inquisition, but returned to England in 1726 and became Protestant, though later he rejoined (1745) the Catholic communion. He edited the *Universal History* (1735-44), and wrote a *History of the Popes* (1748-66).

Bower, or BOWMAKER, WALTER (1335-1449), 'the continuator of Fordun's *Scotichronicon*,' was born at Haddington, Scotland. At the age of eighteen he assumed

the religious habit, and went to Paris to study the civil and canon law. On his return to Scotland in 1418 he was elected abbot of Inchoolm, in the Firth of Forth. On the death of Fordun he was asked by Sir David Stewart to complete the *Scotichronicon*. This he did, also inserting large interpolations in Fordun's work, and continuing the narrative to the death of James I. (1437). On the *Scotichronicon*, which was written in Latin, nearly all the early histories of Scotland are founded. The only complete edition of the text is that of Goodall (1759); there is no complete translation.

Bowerbank, JAMES SCOTT (1797-1877), English geologist, born in London; was one of the founders of the London Clay Club (1836), and of the Palaeontological Society (1847). He made an exhaustive study of fossil and living British sponges, and published *A Monograph of British Spongiada* (Ray Society, 1864-82), and *Fossil Fruits of the London Clay* (1840). His fine collection was purchased (1864) by the British Museum.

Bowerbankia, a genus of ascidioid Polyzoa, of the family Vesiculariidae, named after Bowerbank. (See above.) The stem of *B. imbricata* is a long, slender thread, irregularly branched, the zoecia occurring at intervals. It is common in the Menai Strait and in Jersey, and adheres in numbers to the chains of the steam ferries at Portsmouth and Southampton.

Bower-bird, a name applied to several different birds inhabiting the Australian region. They all possess the habit of constructing bowers or runs, which have nothing to do with nesting, but are apparently built only for sport and æsthetic satisfaction. Certain species—e.g. *Scenopæetes dentirostris*—make clearings in

the forest, and decorate these with leaves, berries, and flowers. The species of *Prionodura* build bowers or huts between trees, the main hut being decorated with ferns and moss, and surrounded by smaller structures. Most remarkable of all is the 'garden' and hut of *Amblyornis inornata*. The hut is of elaborate structure, with a central cone of moss, and a surrounding gallery built of orchid stems, open in front to the lawn or 'garden,' which is some nine feet in diameter, and consists of a bed of bright green moss, decked with brilliant flowers and berries. As these decorations wither they are removed and replaced by fresh material. It appears probable that it is the males alone which construct the bowers, and these are apparently used as places in which they may display themselves before their mates. The bowers are constructed in captivity, and may be seen in the Zoological Gardens at London. The bower-birds are now usually included, with the birds of paradise, in the family Paradiseidae. See Gould's *Birds of Australia* (1848).

Bowfin, or MUD-FISH (*Amia calva*), a ganoid fish found in still water in the United States. Like its allies, it has a well-developed swim-bladder, which functions as a lung, the animal rising to the surface to gulp in air. The length does not exceed two feet.

Bowie-knife, the heavy sheath knife of the western states, U.S.A.; is called after a Colonel James Bowie (1790-1836), who wrought the blade from a worn-out file with which he had already killed his man. The blade is about a foot long.

Bow-legs, or GENU-^{VARUM}, may occur in one leg only, following on accident or operation; but it is usually found in both legs, and the trouble starts when the child begins to walk. The usual

cause is rickets, which renders the lower limbs unfit to bear the weight of the body, so that the bones curve both in the thigh and below the knee, which becomes the most prominent point of the convexity. Bow-legs are also induced by certain occupations, as that of postillion or jockey, followed before the bones have attained full growth and hardness. A very active and heavy child may tend to become bow-legged, though perfectly healthy, by being too much upon its feet. Bow-leg may be restricted to the part below the knee, the bones having a forward or outward convexity, or a double curve, when rickets is the cause. Treatment depends upon the cause of the deformity and the age of the patient. In a rickety case diet and general hygiene are even more important than local treatment, which, however, must not be neglected. Full rest, on the back, must be ensured; and the nurse can do a great deal by systematic straightening and stretching of the limbs, and by daily massage. The bending of the long bones depends on the amount and direction of the pressure to which they are subjected. It does not occur to any extent in infants who are kept lying flat. In more pronounced cases, treated while the bones are still soft, the legs are often bandaged together, or to iron splints on the inner side of the curvature. Later still, osteoclasm, or the breaking of the bone and setting it straight in splints, is performed. In the case of strong, fully-grown bones osteotomy is practised—an operation involving the removal of wedge-shaped portions of bone.

Bowles, CAROLINE. See SOUTHEY.

Bowles, THOMAS GIBSON (1844), M.P. for King's Lynn from 1892 to 1906; contested unsuccessfully the City of London against

Mr. A. J. Balfour, after the resignation of the Hon. A. G. H. Gibbs in 1906. In January 1910 he was elected again for King's Lynn, but defeated in the December election of that year. He began life as an official of the Inland Revenue department (1860-8). Upon leaving the civil service Mr. Bowles started *Vanity Fair*, but subsequently sold it, and now owns *The Lady*. During the siege of Paris he acted as correspondent for the *Morning Post*; was in Turkey in 1878, and in the same year assisted the Duke of Sutherland in starting the Stafford House committee for the relief of the distressed and suffering Turks. Mr. Bowles also has a considerable knowledge of maritime law. He has been immortalized in *Punch* as 'Cap'n Tommy Bowles.' It was he who dubbed the Marquis of Salisbury's last administration the 'Hotel Cecil,' because of the number of his relatives it contained. He has written *The Defence of Paris* (1871), *Maritime Warfare* (1878), *Flotsam and Jetsam* (1882), *Log of the Nereid* (1889), *The Declaration of Paris of 1856* (1900), and a work upon the Declaration of London (1910).

Bowles, WILLIAM LISLE (1762-1850), English poet and antiquary, was rector of Bromhill in Wiltshire from 1804 to his death, and (from 1828) canon residentiary of Salisbury Cathedral and (1818) chaplain to the prince regent. Bowles's first and best work, *Fourteen Sonnets on Picturesque Spots* (1789), influenced Coleridge, then a boy of seventeen. His poetical works are very numerous, but not of great merit. Among them are *Verses to John Howard* (1789), *The Spirit of Discovery* (1805), *The Missionary of the Andes* (1815), and *St. John in Patmos* (1833). In 1807 appeared his edition of Pope; and his strictures on the classical theory of

verse gave rise to a long discussion, in which his chief opponents were Lord Byron, Campbell, and the *Quarterly Review*. Bowles was the propagandist of the revolt against the classical school. See autobiographical introduction to W. L. Bowles's *Scenes and Shadows* (1837), also in vol. ii. of his *Poetical Works* (ed. Gilfillan, 1855).

Bowling. See CRICKET.

Bowling Green. (1.) City, Kentucky, U.S.A., the co. seat of Warren co., situated in the s.w. part of the state, 93 m. s.s.w. of Louisville, at the head of navigation on the Barren R. It has an extensive commerce in horses, lumber, and tobacco. It is the seat of Ogden College (1877), Potter College for Women (1889), and St. Columba's Academy. Pop. 8,500. (2.) Co. seat of Wood co., Ohio, U.S.A., 20 m. s.s.w. of Toledo; has natural gas and oil wells, foundries, canneries, and glass factories. Pop. 5,000.

Bowls, or BOWLING, a game played on a specially kept lawn of certain dimensions, with large biased balls of hard wood. According to William Fitzstephen (d. c. 1191), the biographer of Thomas Becket, the youth of London took their pleasure in *jactu lapidum*; and from the fact that balls of stone were used in the earlier forms of the game, this allusion has been held to refer to bowls. At a later period bowls was forbidden by several Parliaments grown anxious about the decay of archery; and the evil reputation of the bowling alleys, which were usually associated with taverns, led to further restrictions. Henry VIII. broke his own laws when he played bowls at Hampton Court Palace to amuse fair Anne Boleyn; and the famous incident of Sir Francis Drake playing at Plymouth Hoe after the Armada had been sighted is probably authentic. Charles I. was an

ardent bowler, and tradition has it that he was engaged in a game when Cornet Joyce arrested him. During the Georgian *régime* the bowling green was the favourite rendezvous of the wits. In course of time the game was taken more seriously, especially in Scotland, where many greens were laid with sea turf, the accurate smoothness of which enabled the game to be played scientifically. It was long ago felt that the game should be made the subject of uniform laws, and rules were formulated in 1893 by the Scottish Bowling Association, a society which bears to bowls much the same relation that the M.C.C. bears to cricket, and the Royal and Ancient Club of St. Andrews to golf. The first year of the 20th century saw a visit to the mother country of a team of bowlers from Australia and New Zealand, who played with varying success the strongest clubs in the British Isles. In order to adjust the points of difference between the colonial and the British games, the Imperial Bowling Association (founded 1899) undertook to codify the laws, and their 'new code' was issued in 1901.

There are two varieties of the game—the crown-green and the flat-green game. The latter is the real game, crown greens being almost entirely confined to the northern and the midland counties of England. In the crown green there is a fall from the centre to the ditch of eighteen inches, more or less, according to the dimensions of the lawn. The jack may be thrown in any direction, and the players use bowls of little or no bias. No doubt a sporting game may be enjoyed; but pot-hunting, betting, and gate-money have fastened upon the crown-green game, which therefore lies under a ban.

The flat-green game is very simple. Standing at the 'footer,'

IV.

or mat, the player rolls the jack (a white ball) straight in front of him to a distance the limits of which are prescribed by rule, and then tries to place his bowls as close to it as possible, and nearer than the nearest of his adversary, the opponents playing each one bowl alternately. The bowler must measure the distance with his eye, allow for bias, judge of strength, circumvent his opponent's bowl if it lies in his path, promote a short bowl of his own side, run a hostile bowl off the jack; upon occasion he must fire with great force, in order to scatter the enemy; and often he must be content with laying a block or guard. Always, if he is a sportsman, he must be prepared to efface himself; for bowls, more than most games, suffers when an individualist appears in a rink.

The ideal green is a sheet of perfectly level turf forty yards square (though no particular dimensions are defined), and is divided into rinks twenty feet wide. Thus, a green of the size indicated affords space for six rinks; and as there are eight players to the rink (*i.e.* four a side), forty-eight players may be engaged on a green simultaneously. The bowls are made of lignum vitæ, are round to oval in shape, and have one side more 'biased' than the other, bias being imparted by the lathe. Usually a side is composed of four players, each with a distinct function. The first is called the 'leader,' and should be a good all-round man. It is his business to throw the jack and to 'lead' to it; he must be well up to it, the ideal position being immediately behind the jack. The second has to do as he is told. A captain will play his weakest man here (hence the phrase, the 'soft second'). He is sometimes called the 'scorer,' because he keeps the score of the game. The third

man, who also has to do as he is bidden, is the 'measurer,' for he takes charge of one end of the cord when it is necessary to measure opposing bowls. The fourth is the 'skip,' 'driver,' or 'captain,' and must be a player of great resource and judgment, for upon his play often rests victory or defeat. He directs the play of his first three men, and his instructions are implicitly followed. When he takes his place at the mat, he is supposed to know the lie of the wood around the jack; but he may appoint one of his men to instruct him if required. A game ordinarily consists of twenty-five (more or less) 'heads' or 'ends' (i.e. full rounds from each end of the green: for play is first from one end, then from the other, and so on alternately), the side holding the highest aggregate at the close of the twenty-fifth head winning. Or, less frequently, it may be agreed to play a game of twenty-one (more or less) points up. On a really good green a rink of four a side is necessary; but on coarser greens players are often limited to two or three a side. Such greens as these, however, are being replaced by lawns worthier of the game.

The so-called 'points' game is a competition to encourage excellence in particular feats. Diagrams to suit the different positions are marked on the turf; and skill in guarding a well-lying bowl, or in drawing close to the jack past certain obstacles, or in trailing the jack from between definite objects, or in driving the jack into the ditch, is rewarded by appropriate scores.

Bowls is in favour wherever an English-speaking community can find a suitable sheet of turf. Clubs in Scotland are counted by the hundred. In England they are growing rapidly; even in London, notwithstanding the costliness of

sites, there are no fewer than forty. In Ireland the game shows an upward tendency, as well as in Australia, Canada, S. Africa, the United States, and elsewhere. Following the example of several of the leading Scottish towns, the London County Council has constructed greens in some of their public parks upon which play is free of charge; though on Scottish public greens a trifling fee is levied per hour or game.

See articles in the *Field* for 1900-3 over the signature of 'Jack High.' For the laws, Mitchell's *Manual of Bowl-playing* (1864; new ed. 1880), and the *Laws of the Scottish Bowling Association* (1893) and of the *Imperial Bowling Association* (1901), should be consulted. For historical references, see Dingley's *Touchers and Rules* (1893); Macgregor's *Pastimes and Players*, ch. ix. (1881); and Fittis's *Sports and Pastimes of Scotland*, ch. xii. (1891).

Bowman, SIR WILLIAM (1816-92), English ophthalmic surgeon, was born at Nantwich. From 1845-55 he was professor of physiology and anatomy at King's College, London, and from 1846-76 resident surgeon in the Royal Ophthalmic Hospital, London. His works include *The Anatomy and Physiology of Man* (1843-56) and *Lectures on Operations on the Eye* (1849). His *Collected Papers*, with a Life by H. Power, appeared in 1892.

Bowness, picturesque tn., Westmorland, England, on E. shore of Windermere, 8 m. n.w. of Kendal. Much frequented in the summer months by tourists. Pop. 2,700.

Bowral, tn., co. Camden, New South Wales, 80 m. by rail s. of Sydney. The celebrated Gibraltar Tunnel (572 yards) and the Gib (a cliff 2,800 ft. high) are within the municipality. Macquarie Pass, the Belmore Fitzroy and other waterfalls, are within easy access.

The town is a fashionable resort in summer. Alt. 2,230 ft. Pop. 1,800.

Bowring, SIR JOHN (1792-1872), linguist and British civil servant, born at Exeter. It is said that he acquired a competent knowledge of one hundred languages. Up to 1824 he engaged in commercial pursuits, but found leisure to issue several works. In 1824 he became editor of the *Westminster Review*, and during the next few years published various anthologies of foreign poetry. In 1831 he was sent to France as commissioner to examine and report on the public accounts, and subsequently to Belgium, Italy, Turkey, Egypt, Syria, and the German states. He entered Parliament as an active free-trader in 1835, but lost his seat in 1837; from 1841-9 he was member for Bolton. Financial losses caused his resignation, and in 1854 he was knighted and made governor of Hong-kong, and chief superintendent of trade in China. In 1856 occurred the well-known affair of the *Iorcha Arrow*. To punish the insult to the British flag, Bowring ordered the bombardment of Canton. Votes of censure were moved on Bowring in Parliament, and the Palmerston ministry was defeated in the Commons, but on appeal to the country returned to power. He retired in 1859, and gave himself up to literary pursuits. Among his works may be mentioned *The Kingdom and People of Siam* (1857), *A Visit to the Philippine Islands* (1859), *Ancient Poetry and Romances of Spain* (1824), *Poetry of the Magyars* (1830), *The Decimal System* (1854), and *Serbian Popular Poetry* (1827). See also his *Autobiographical Recollections* (1877).

Bowstring Hemp, the fibre of the *Sansevieria zeylanica*, a plant of the order Hamdoraceæ. It is a native of the E. Indies, where

it is called *moorva*. The fibre—white, silky, and elastic—is of use in making strings for bows. A similar variety yields the almost identical African hemp.

Bow Window. See BAY WINDOW.

Bowyer, SIR GEORGE (1811-83), English jurist and Catholic controversial writer, was called to the bar of the Middle Temple (1839); became reader in law there (1850); M.P. for Dundalk (1852-68), and for Co. Wexford as a Home Ruler (1874-80). Converted to Catholicism in 1850, he became the authorized defender of the Pope's distribution of England into Catholic sees. His legal works include *English Constitution* (1841), *Commentaries on the Modern Civil Law* (1848), and *Commentaries on Universal Public Law* (1854).

Bowyer, WILLIAM (1699-1777), 'the learned printer,' was appointed (1729) to print the votes of the House of Commons, and became printer for the Society of Antiquaries (1736) and for the Royal Society (1761). In 1763 he published his *Conjectural Emendations of the Greek Testament*, and in 1774 (anonymously) his *Origin of Printing*. Most of his learned pamphlets, prefaces, etc., are reprinted in *Miscellaneous Tracts*, by J. Nichols (1785). See Hansard's *Typographia* (new ed. 1869).

Box. The common box tree (*Buxus sempervirens*) is best known in Britain by its variety *suffruticosa*, largely employed as a garden edging. It is a native of the countries bordering the Mediterranean, as well as of China. The species is an evergreen shrub, growing, under good treatment, to twenty or thirty feet in height, and was formerly much used as a hedge plant in formal gardens. It enjoys partial shade and liberal feeding. It is propagated by cuttings

taken in August and inserted under a glass in a shady spot. The dwarf variety is best increased by division. Other hardy species are *B. japonica*, which grows to about five feet in height; and *B. microphylla*, a small-leaved, dwarf-growing shrub. *B. balearica*, on the other hand, requires a little winter protection, except in the warmer parts of Britain. It is an attractive shrub, and often reaches a height of twenty feet. Male and female flowers are borne on the same tree. The box belongs to the order Euphorbiaceæ. The value of the wood of the box tree has long been recognized—cf. Isa. 41:19, and again in 60:13. Virgil refers to boxwood inlaid with ivory. Wood engravings are executed on boxwood; it is also used for the handles of many tools, and for the manufacture of flutes and clarionets.

Boxall, SIR WILLIAM (1800-79), English portrait painter, studied at the Royal Academy, London, and in Italy (1827-9). He was elected R.A. (1853), director of the National Gallery, London (1865-74), and was knighted (1867). At the Royal Academy he exhibited *Jupiter and Latona* (1823), *The Contention of Michael and Satan for the Body of Moses* (1824), *Milton's Reconciliation with his Wife* (1829), *Leur and Cordelia* (1831), and other historical and dramatic subjects, as well as scenes from the 'Waverley Novels.' In later life he devoted himself almost entirely to portraiture, and painted, for Trinity House, the Prince Consort, wearing his robes as Master.

Box-days, two days in the spring and two in the autumn vacations, and one day in the Christmas recess, fixed by the Scottish judges for lodging defences, pleadings, and other papers ordered by the court towards the close of the session.

Boxers, THE, the name given by Europeans to a Chinese society, which early in 1900 organized a widespread anti-missionary rising in Shantung and other provinces of N. China, and murdered many European missionaries and native Christians. The movement was at the same time strongly anti-foreign, and had been to a great extent fostered by the grasping demands of the Western powers for concessions and the opening up of the country. The Manchu element at court, headed by the dowager-empress, at first opposed, but afterwards encouraged, the movement—a course which culminated in the assassination of Baron von Ketteler, the German minister at Peking, the destruction of several of the legations, and the siege of upwards of two hundred foreign refugees within the walls of the British legation at Peking. A relief expedition, in which British, French, Germans, Russians, Americans, and Japanese took part, was at once organized. The allies' ships bombarded and destroyed the Taku forts, and an unsuccessful advance on Peking was made under Admiral Seymour. The allied troops again advanced, and after heavy fighting at Tientsin, Pei-tsung, and Yang-tsun, succeeded in relieving the besieged on Aug. 14, 1900. The court fled from the capital and the allies remained in possession until peace was signed on Sept. 7, 1901, one of the conditions of which was that China should pay £64,000,000 as indemnity to the foreign powers. See Sir R. Hart's *These from the Land of Sinim* (1901), and *China under the Empress-Dowager*, by Bland and Backhouse (1910).

Boxhagen-Rummelsburg, comm., prov. Brandenburg, Prussia, immediately E. of Berlin. Pop. 35,000.

Box-hauling, the method adopted of working a ship from

one tack to another, by means of braving the headyards aback, either after luffing or wearing short round, instead of making a long sweep. To 'box off' is to box the vessel's head away from the wind after she has missed stays.

Boxing. (LOVE-FIGHTING, as distinct from pugilism, fighting with the bare knuckles, has gained immensely in popularity of late years since the 'old' style went out of fashion, and in the present century all contests for the championship of the world have been decided with the gloves. The old style has been modified to suit new conditions, and though modern boxers may possibly be more scientific, some bad practices have been introduced, the worst of which is that of stopping a blow with the open glove, as an attempt to parry a naked fist in this manner must result in injury to the hand. Another vicious innovation is the giving of huge purses and awarding a disproportionate amount to the loser, thereby encouraging a man who is getting the worst of a bout either to pretend he cannot come up to time, or to lay himself open to a disabling blow which will knock him out for ten seconds and certainly not hurt him ten hours, for doing which he receives some five or six hundred pounds. The best heavy-weight boxers of recent years have been J. L. Sullivan, Jem Corbett, Jem Jeffries (Americans), Bob Fitzsimmons (a Cornishman resident in America), Frank Slavin (Australian), Tom Sharkey (a sailor), and Peter Jackson, Jack Johnson, champion 1910, and Sam Langford (negroes), etc.

The rules for boxing competitions are all based on those framed by the Marquis of Queensberry (1867), a distinguished patron of the art. They are, generally speaking:—The ring shall be roped, and twenty-four feet

square. Competitors to box in light boots or shoes (without spikes) or in socks, with knickerbockers, breeches, or trousers, and wear jerseys. The result shall be decided by two judges, with a referee, or by a referee only. In three-round contests the duration of the first two rounds shall be three minutes, and the final round four minutes, and the interval between each round shall be one minute; in longer contests the usual duration is three minutes. Any competitor failing to come up when 'Time' is called, either at the end of the interval or within ten seconds of being knocked down, shall be declared the loser. Where a competitor draws a bye, he shall be bound to spar such bye for the specified time, and with such opponent as the judges or referee may approve. Each competitor shall be entitled to the assistance of one attendant only, and no advice or coaching shall be given to any competitor by his second, or by any other person, during the progress of any round. The referee shall have power to give his casting vote when the judges disagree, or to stop the contest in either the second or third round in the event of its being very one-sided; and in three-round contests he can, further, order a fourth round, limited to two minutes, in the event of the judges disagreeing. The decision of the judges or the referee, as the case may be, shall be final and without appeal. The referee may, after cautioning the offender, disqualify a competitor who is boxing unfairly by flicking or hitting with the open glove, by hitting with the inside or butt of the hand, the wrist or elbow, holding, or by wrestling or roughing at the ropes. In the event of any question arising not provided for in the rules or articles, the referee to have full power to

decide such question, and his decision to be final.

The ordinary terms in boxing, with their explanations, are:—

Break away, the order given by the referee to the combatants to separate when they have clinched or closed, as in wrestling; the act of breaking away.

Breaking ground, moving swiftly to the right or left with a view of disconcerting your adversary and opening an attack.

Counter hit, to hit your adversary whilst he is in the act of hitting at you. It is the most punishing of all blows, as, if properly timed, your adversary suffers from the impact of his own weight as well as yours.

Cross-counter, to hit your adversary with your right hand on the head when he is in the act of striking at you with the left.

Draw, to induce your adversary to make an effort towards you in response to a feint.

Draw back, to draw your head or body out of reach of a blow without shifting your ground.

Duck, to avoid a blow by moving your head out of the way.

Feint, to pretend to strike.

Form, attitude and motion.

Hit, a blow struck with the knuckles of either hand on the head or any part of the body (except the arms) above the belt.

In-fighting, fighting within arm's length.

Knock-out, a blow which disables a competitor, and prevents him from resuming the fight after ten seconds have been counted.

Lead off, to open an attack with either hand on the head or body.

Out-fighting, fighting farther off than at arm's length.

Parry, or *guard*, to ward off a blow with the arm or glove.

Rally, a rapid exchange of blows without intermission.

Return, a blow delivered im-

mediately after your adversary has struck at you.

Slip, or *side step*, to bend down and step quickly to the right or left of an attacking adversary by changing your feet.

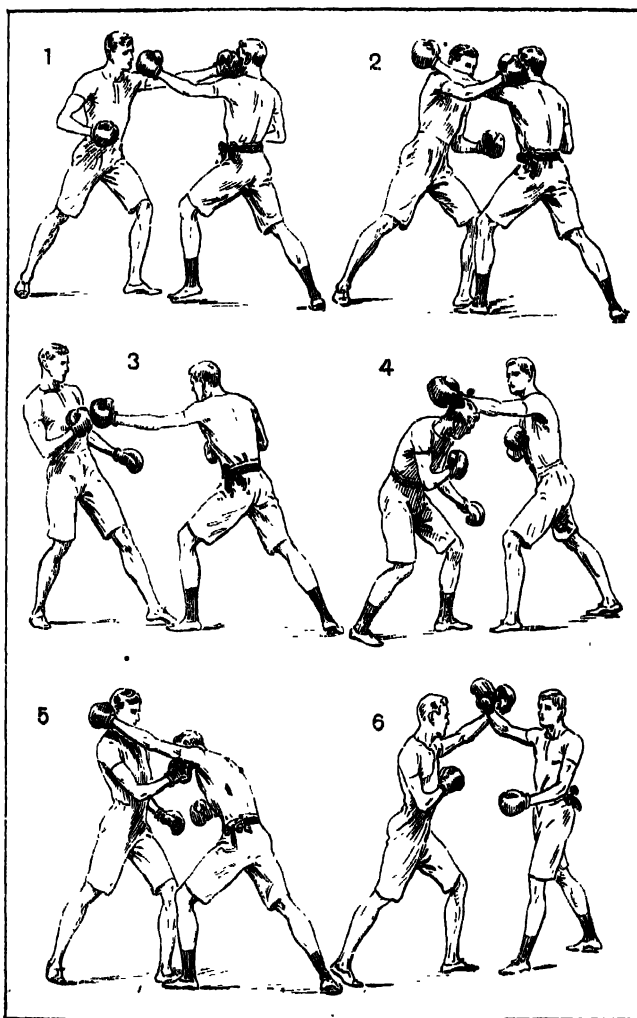
Time, to strike your adversary at the time your blow will punish him most.

Upper cut, a blow delivered with either hand upwards on the face of an adversary attacking with his head down.

See Allanson-Winn's *Boxing* ('The Isthmian Series,' 1896); Trotter's *Boxing* ('The Oval Series,' 1893); Mitchell's *Boxing* ('Badminton Library,' 1889); and Johnstone's *Modern System of Glove-Fighting* (1906).

PUGILISM.—The rules of prize-fighting—i.e. contests for a money stake with the naked fists—differ somewhat from those of boxing with the gloves. The rounds are of unlimited duration, and are terminated by one or other combatant falling on giving or receiving a blow, or by being thrown. Wrestling and holding are allowed, provided the hold is above the waist. The usual interval between the rounds is half a minute. The combatant who is unable to stand up to his adversary when 'Time' is called at the expiration of the interval loses the fight. He may also be disqualified for violation of the rules.

This sport was first brought into prominence by James Figg in London, in 1719. The boxing boom reached its height in 1734-50, when Jack Broughton flourished. To this famous boxer we are indebted for the invention of the boxing-glove, or muffler as it was then called, as well as for the first code of rules, from which those at present in force have been developed. After Broughton's death pugilism declined in favour for a time; but Tom Johnstone restored its popularity. Then



Boxing: Postures in Attack and Defence.

1. Counter. 2. Cross-counter. 3. Draw back. 4. Duck. 5. Right upper cut. 6. Parry.

began the period of highest prosperity for the ring, which lasted until the retirement of Tom Spring in 1824, during which time Humphreys, Mendoza, 'Gentleman' Jackson, Belcher, Pearce ('the Game Chicken'), Gully (who became an M.P.), Cribb, Spring, Bendigo (who afterwards turned revivalist preacher, and is said, in case of an unsatisfactory collection, to have stimulated the charity of his audience by the threat of applied muscular Christianity), Ward (of earlier date), Randall, Curtis, and Dutch Sam attained celebrity. It was resuscitated for a time by the splendid battles of heavy weights such as Heenan, Tom Kifig, Tom Sayers, and Jem Mace (a smaller man) from 1851 to 1860; and a host of light and middle weights, the most celebrated perhaps of whom was the undefeated Johnny Broome. Another undefeated light-weight, with whom many now alive were acquainted, was Bat Mullins, who died recently. For the most part the men fought honestly, though 'sold' fights were never unknown. The baneful influence of gambling, however, almost from the first, cast its evil shadow over the ring. The law also, almost from the first, discountenanced such contests, and, after the fight between King and Heenan in 1863, very definitely pronounced against them. Towards the end of the 19th century interest in prize-fighting revived spasmodically, chiefly owing to the discovery of a moderate heavy-weight, Jem Smith, and there were a few prize-fights, most notable of which was a game contest in France between Smith and another second-rater, Kilrain, from America; but the revival, which was ruined by journalistic panegyrics and unscrupulous gambling, quickly died away, and is not likely to be resuscitated.

See Godfrey's *A Treatise on the Useful Art of Self-Defence* (1740); Donnelly's *Boxing Handbook* (1801); Bee's *Lives of the Boxers* (1811); Egan's *Boxiana* (1818-24); Miles's *Pugilistica* (1880-1); 'Philopugilist's' *Life of Tom Sayers* (1864); Dowling's *Fistiana* (1864); Henning's *Fights for the Championship* (2 vols. 1902).

Boxing Day, the day after Christmas Day, on which Christmas boxes or presents are given to employes or messengers. It is a bank holiday in England.

Boxtel, tn., prov. N. Brabant, Netherlands, 7 m. s. of 's Hertogenbosch (Bois-le-Duc). Here, in 1794, the French defeated the allied Dutch and English. Pop. of comm. 7,000.

Box-thorn, the English name of ornamental plants of the genus *Lycium*, of the order Solanaceæ, or nightshades. There are two common species—the *Lycium barbarum*, used extensively for decorating walls or arbours, and the spiny *Lycium europæum*, adopted as a hedge plant. The smaller shoots are eaten in Spain.

Boyaca, tn., Colombia, 20 m. s. of Tunja, scene of Bolivar's victory over the Spanish forces, August 7, 1819. Pop. 7,000.

Boyar, the highest rank, military and civil, next to *knyaz* (prince), in the old Russian aristocracy. Before the organization of the empire under Peter the Great, the boyars, at first a nobility of office, had considerable independence in the separate principalities, and might withhold consent to any phase of the Czars. Since Peter's time the title has been honorary, the boyars being incorporated with the Russian nobility. The conservative section of the Roumanian Parliament is called the Boyar party. See Sir D. M. Wallace's *Russia*, ch. xvii. (new ed. 1887).

Boy-bishop. In the mediæval church it was the custom to allow

choristers of cathedrals on St. Nicholas's Day (Dec. 6) to choose one of their number to act as bishop till Innocents' Day (Dec. 28). The practice was finally abolished in England in the reign of Elizabeth, and on the Continent by the Council of Basel (1431).

Boyce, WILLIAM (1710-79), English musical composer, was born in London. In 1736 he became composer to the Chapel Royal, and (1758) organist. Dr. Greene, whose pupil he was, left him to complete and publish his *English Cathedral Music* (1760), important as being the earliest collection of 16th and 17th century church music in score. It was reprinted, with additions, in 1849. Boyce is remembered chiefly for the tune of the patriotic song *Hearts of Oak*.

Boycotting, a conspiracy to prevent social or commercial intercourse with any objectionable person. The word was derived from a Captain Charles Cunningham Boycott (1832-97) who, in 1880, was land agent to Lord Erne in Mayo, Ireland, and had evicted a large number of tenants. His neighbours organized a system of unlawful intimidation by which they restrained the tenantry and others from all intercourse with Boycott and his family. About sixty Orangemen from the north of Ireland visited the estate and gathered in the crops, protected by government forces and constabulary. This was called 'the Boycott relief expedition.' Eventually the severe measures adopted (1887) by government gave the death-blow to this iniquitous system of 'exclusive dealing.'

Boyd, ANDREW KENNEDY HUTCHISON (1825-99), commonly referred to as A.K.H.B., Scottish divine, was born at Auchinleck, Ayrshire. He was parish minister, successively, of Newton-on-Ayr (1851-4); Kirkpatrick-Irongray, Dumfries (1854-9); St. Bernard's,

Edinburgh (1859-65); and St. Andrews (1865-99). He laboured successfully to improve the church ritual. Through *Fraser's Magazine* Boyd achieved fame with *Recreations of a Country Parson*, published in three series (1859-78). Similar work is in *Graver Thoughts and Critical Essays of a Country Parson*, published in three series (1862-75), and his many books of homilies and sermons issued between 1862 and 1889. *Twenty-five Years of St. Andrews* (1892), *St. Andrews and Elsewhere* (1894), and *Last Years of St. Andrews* (1896), observant, humorous, sparkling with anecdotes, and trenchantly plain-spoken, constitute a valuable contemporary record.

Boyd, MARK ALEXANDER (1563-1601), Scottish author, a younger son of Robert Boyd, Penkill, Ayrshire; studied law at Paris, Orleans, and Bourges, securing at the last-named centre the friendship of Cujacius. In 1587 he took service with the Catholics in the League war, but resumed his studies next year at Toulouse, whence he escaped as a suspect to Bordeaux during a Catholic insurrection. After his elder brother's death, in 1595, he returned to Scotland, and was for a time travelling tutor to the Earl of Cassilis. He died at Penkill, and was buried in the church of Dailly, Ayrshire. Boyd published at Amsterdam, in 1592, a volume of Latin poems with a stilted dedication to James VI. In the *Delicie Poetarum Scotorum* (1637) he is represented by *Epistole Heroidum* and *Hymni*, which display ready scholarship and ingenuity, though deficient in taste and grace of style. See Sir David Dalrymple's (Lord Hailes) *Sketch of the Life of Mark Alexander Boyd* (1787); Sir R. Sibbald's *Scotia Illustrata* (1683); D. Irving's *Lives of Scottish Writers*, i. 182 (1839); Grub's *Ecclcs. Hist. of Scot.*, ii. 191, 225 (1861).

Boyd, ZACHARY (? 1585-1653), Scottish theologian, descended from the Boyds of Penkill, completed his education at Saumur College, France, where he became regent in 1611. After his return to Scotland in 1621, he was appointed incumbent of Barony parish, Glasgow, in 1623. In 1633, at Holyrood Palace, he addressed Charles I. in a eulogistic Latin oration. He was lord rector of Glasgow University in 1634-5, and again in 1645, and was also for a time its dean of faculty and vice-chancellor. On October 13, 1650, he soundly rated Cromwell, who was present, in a sermon preached in Glasgow Cathedral; but the Puritan leader in private gained his respect. Boyd left his books and MSS., besides a handsome legacy, to Glasgow University. His *Last Battell of the Soule in Death* (2 vols. 1629) is in dialogue, with a certain dramatic force. It was edited, with Life of Boyd, by Gabriel Neil (1831). A poem on Leslie's victory at Newburn appeared c. 1640. *Four Letters of Comfort for the Deaths of the Earl of Huddington and Lord Boyd* (1640) were reprinted in 1878. In 1643 appeared *Crosses, Comforts, and Councils*. The General Assembly declined to adopt for service Boyd's *Psalms of David in Meter* (1646). The *Zion's Flowers*—metrical versions of Scripture, known as 'Boyd's Bible'—remained in MS. till 1855, when four of the poems were edited by Gabriel Neil. See R. Baillie's *Letters and Journals*, i. 411 (1841); *Acts of the General Assemblies*, 1682, pp. 353, 428, 479; M'Ure's *View of the City of Glasgow*, p. 228 (1736); Pinkerton's *Iconographia Scotica* (1797); Irving's *Hist. of Scottish Poetry*, p. 517 (1861).

Boydell, JOHN (1719-1804), English engraver and print publisher. In the latter capacity he built up (c. 1751) a large conti-

nental trade, his first important engraving being Woollett's plate after Wilson's *Niobe*. In 1786 he commenced the publication of a series of prints on Shakespeare, after pictures specially painted by English artists, and built the Shakespeare Gallery in Pall Mall for their exhibition; but the French Revolution having destroyed his foreign trade, in 1804 he applied to Parliament for permission to sell his pictures by lottery. In 1790 he was elected lord mayor of London. He was the first to make English art known to the Continent.

Boyer, ARL (1667-1729), miscellaneous writer, translator and adapter of Racine and Fénelon, and author of the long popular *Dictionnaire Royal* (French and English). He was born at Castres, in France, but went to England in 1689. In 1703 he began to issue a *History of the Reign of Queen Anne*, an annual register of events; and in 1711 a monthly *Political State of Great Britain*, the first regular parliamentary reports of tolerable accuracy (38 vols. 1711-29).

Boyer, ALEXIS (1757-1833), surgeon to Napoleon, qualified (1787) as a surgeon in the face of great difficulties, and was called to the chair of operative medicine in the Ecole de Santé, Paris (1792), and appointed (1794) second surgeon in the Hôtel Dieu. The emperor created him premier surgeon (1805) and a baron of the empire (1807). He was one of the first members of the new academy of medicine, and in 1823 became consulting surgeon to Louis XVIII., a post which he held under the two succeeding monarchs. He published two standard works—*Traité Complet de l'Anatomie* (1797-9), and *Traité des Maladies Chirurgicales* (11 vols. 1814-26; new ed. in 7 vols. 1844-53).

Boyer, JEAN PIERRE (1776-1850), general, and president of

the republic of Hayti, took part in the revolution of 1793, and in the internal wars which followed it. On the death of Pétion (1818) he was selected president, and soon ruled over the whole island. His agreement to indemnify the ruined French settlers, and his refusal to concede certain commercial concessions to France as the sovereign country, caused his downfall, and he had to flee (1843) to Jamaica. He died in Paris.

Boyesen, HJALMAR HJORTH (1848-95), author, born in Norway, emigrated to the United States in 1868; became professor of German at Cornell University (1874), and professor at Columbia University, New York (1880-95). In addition to novels (*Gunnar*, 1874; *Illa on the Hilltop*, 1881; etc.) and poems (*Idylls of Norway*, 1882), he wrote *Goethe and Schiller* (1878; 3rd ed. 1885), *History of Norway* (1886), *Essays on German Literature* (1892), a monograph on *Ibsen* (1894), and *Essays on Scandinavian Literature* (1895).

Boyle, par. (19,618 ac.) and mkt. tn., Co. Roscommon, Connaught, Ireland, on river Boyle, 24 m. S.S.E. of Sligo. The town grew up round a Cistercian abbey established in 1161; in 1235 it was occupied by the English. Pop. 2,500.

Boyle, Earls of Orreery. See ORREERY.

Boyle, RICHARD, Earl of Cork. See CORK, EARL OF.

Boyle, THE HON. ROBERT (1627-91), physicist and chemist, was the seventh son of the first Earl of Cork, and was born at Lisinore Castle, Ireland. He lived successively at Stalbridge in Dorsetshire, Oxford (1654-68), and London. Devoting himself to chemistry, he published, in 1660, *New Experiments, Physico-Mechanical*—in an appendix to the second edition of which (1662) he enunciated and roughly proved the statement, now

known as 'Boyle's law,' that 'the volume of a given mass of gas is inversely proportional to its pressure.' He was closely connected with the Royal Society. Boyle's greatness lies rather in his exhibition of the analytic method over the whole field of science of his day, than in his positive contributions to knowledge. Yet he was the first to distinguish a mixture from a compound, and to define an element accurately. He invented a compressed air-pump, superintended the construction of the first British-made hermetically-sealed thermometer, and made a multitude of observations on atmospheric pressure, expansion of liquids, and on electricity and magnetism. At the same time he was interested in alchemy. Boyle was a director of the East India Company, and was identified with many philanthropic works. He also founded the 'Boyle Lectures.' See his *Philosophical Works Abridged* (1725); Dugald Stewart's 'First Dissertation,' in *Encyc. Brit.* (6th ed. 1821); Birch's *Life* in the folio ed. of the *Works* (1744); Crum Brown's *Development of the Idea of Chemical Composition* (1869); and *Asclepiad*, x., for portrait and sketch of medical work.

Boyle Lectures, a series of lectures instituted by Robert Boyle 'to prove the truth of the Christian religion against atheists, deists, pagans, Jews, and Mohammedans, not descending to any controversies among Christians themselves.' Richard Bentley was the first who gave these lectures. From 1691 to 1902 the published lectures comprised no fewer than 212 volumes.

Boyne, river rising near village of Carbery, Kildare, on borders of King's Co., Ireland; flows then through Meath in N.E. direction, passing Trim, Navan, and Slane; separates Meath from Louth, and

enters the Irish Sea a little below Drogheda, after a course of about 70 m. The Grand Canal crosses the upper course. The river is navigable for vessels to Drogheda, and for barges to Slane. About 3 m. from Drogheda, an obelisk, erected in 1763, marks the spot where the battle of the Boyne was fought, in 1690, between James II. and William of Orange. 'Boyne Water' is the slogan of the Orange party. See Wilde's *The Beauties of the Boyne and Blackwater* (1850).

Boyne, LEONARD (1852), Irish actor, entered the dramatic profession in 1869. He first appeared in London as OZIAS Midwinter in Wilkie Collins's *Miss Gertrude*, at the Globe Theatre (1876). In 1884 he joined Wilson Barrett's company, and played the title rôle of Claudian. In 1892 he appeared at Drury Lane as Captain Vernon in *The Prodigal Daughter*. He visited the United States in 1893, and on his return to England played David Remon in *The Masqueraders*, Jack Allingham in *The Benefit of the Doubt*, and Captain Trefusis in *The Late Mr. Castello*. As actor-manager at the Shaftesbury he produced *Sporting Life*, in which his impersonation of Lord Woodstock was much appreciated. He appeared at the Lyceum as Lord Fellisdale in *For Auld Lang Syne* (1900), Paul Sylva in *Leah Kleschna* (1905), and as Warren Barrington in *The Stronger Sex* (1907).

Boyneburg, or **REMBELBERG**, KONRAD or KURT VON (1494-1567), one of the most famous leaders of *landsknechte* in the time of Charles V., learned the art of war under the great captains Sickingen and Frundsberg; distinguished himself in the capture of Rome (1527), the defence of Naples (1528), the capture of Florence (1530), and in wars against Turks (1532) and French (1537, 1544, 1552-4). See Solger's

Der Landsknechtsobrist Konrad von Rembelberg (1870).

Boys' Brigade, THE, a movement set on foot in 1884 by Mr. (afterwards Sir) W. A. Smith of Glasgow, its object being 'the advancement of Christ's kingdom among boys, and the promotion of habits of obedience, reverence, discipline, self-respect, and all that tends towards a true Christian manliness.' The total number of boys enrolled in the United Kingdom is 52,000, with 4,800 officers, their ages varying between twelve and seventeen. They are formed in companies, in connection with missions, churches, and Sunday schools; they adopt a simple uniform of cap, belt, and haversack, in addition to their ordinary clothes; and they are trained by military drill and discipline. The movement has spread to America and the British colonies. In the United States there are 600 companies, with 28,000 boys; and in Canada there are 120 companies, with 5,000 boys. The total strength throughout the world is 94,000. See also **BOY SCOUT MOVEMENT**.

Boy Scout Movement, THE, was inaugurated by Lieut.-General Sir Robert Baden-Powell in the beginning of 1908. The object of the movement is to develop manliness, self-respect, and self-reliance among boys of all classes, by means of practices and games—such as signalling, tracking and stalking, camping-out, observing nature—which really attract and hold boys. The unit for work is the 'patrol,' or party of six to eight boys under a boy leader. Any number of patrols may combine to form a 'troop,' controlled by a scoutmaster and his assistants. The patrols and troops of a district are supervised by a local committee of scoutmaster representatives, the administration being based on decentralization

of authority and responsibility. Necessary funds are raised locally. A simple but attractive uniform is worn. The movement has made such rapid progress that in Great Britain alone it numbers already some 200,000 members. Boy-scouting has been taken up enthusiastically in Canada, Australia, New Zealand, and in other parts of the empire; and is spreading to Germany, France, Spain, Norway, and other countries. Headquarters of Boy Scouts: 114-118 Victoria Street, Westminster, S.W. An analogous movement for girls, the 'Girl Guides,' has also been started. See *Scouting for Boys* (1909) and Sir R. Baden-Powell's article in *National Defence* (Aug. 1910).

Bozen, or **BOTZEN**, tn. and summer resort in Tyrol, Austria, on the Etsch, 30 m. N. by E. of Trient; in the middle ages an important emporium in the trade between Venice and Central Europe, and still the chief commercial centre of Tyrol. It has an interesting church of the 14th and 15th centuries, and a monument to the poet Walther von der Vogelweide. It is in a rich fruit district; wine is made and cotton manufactured. Pop. 14,000.

Bozrah (mod. *El-Buscireh*), chief city of the Edomites, 25 m. S.E. of the Dead Sea, Palestine. It was a place of great antiquity (Gen. 36:33); now in ruins.

Bozzaris, **MARCOS** (1788-1823), celebrated Greek patriot, 'the modern Leonidas,' was born at Suli in Epirus. From early youth he was in the midst of the struggle for Greek independence. Defeated in 1803 by Ali Pasha, and compelled to retreat to the Ionian Isles, he afterwards joined Ali in 1806, on the latter's revolt against the Sultan, and kept up the war after Ali's defeat and death at Janina (1822). He died near Missolonghi, which he had long defended, in the course

of a daring night attack on the Turkish army in August 1823.

Bra, tn., prov. Cuneo, Italy, 31 m. by rail S. by E. of Turin; breeds silkworms, and trades in wine, truffles, and silk. Pop. 16,000.

Brabançonne, **La**, the national song of Belgium, composed and sung during the revolution in 1830. The words were by Jeneval—i.e. Dechet (1801-30)—a French actor, an active revolutionist, killed fighting near Antwerp in October 1830. The music was composed by François van Campenhout (1779-1848).

Brabant. (1.) **SOUTH BRABANT**, prov. of Belgium, in the middle of the kingdom, between the Meuse and the Scheldt. It is flat, fertile, and the most densely inhabited province of Belgium (1,080 inhabitants to the sq. m.). Both agriculture and manufacturing industries flourish—the latter producing lace, linen, cloth, carpets, hats, spirits, tobacco, starch, paper, chemicals, beer, machinery, leather, pottery, and soap. Area, 1,268 sq. m. Pop. 1,370,000. (Chief town, Brussels. (2.) **NORTH BRABANT**, prov. in S. of Holland, to the E. of Zealand; very level, marshy, and generally unfertile. Area, 1,980 sq. m. Pop. 630,000. Cap. 's Hertogenbosch.

Brabant, **SIR EDWARD YEWID** (1839), South African soldier and politician, born in England, raised and commanded Brabant's Horse, which did excellent service in the Boer war (1899-1902). His subsequent appointment to the command of the Colonial Division was a tribute to his soldierly qualities, and to his influence in Cape Colony. He was elected to the Cape Parliament for East London in 1873, and again in 1882 and 1888. He was also president of the South African League in 1897, and a member of the Defence Committee in 1896-7. He was appointed field-commandant of the colonial forces in 1878, and

in the following year became colonel of the Cape Yeomanry. His services were rewarded with a K.C.B. in 1900. In 1902-4 he was commandant-general of the Cape forces.

Brabazon, JOHN PALMER (1843), British soldier, born in Co. Mayo, Ireland; served in the Ashanti war of 1874. In the Afghan war (1878-80) he was present at the capture of the Peiwar Kotai, and at the engagement at Charashah (Oct. 6, 1879); accompanied Sir Frederick (now Earl) Roberts on his famous march from Kabul to Kandahar (Aug. 9-31, 1880), and was present at the battle of Kandahar (Sept. 1), when Ayub's army was defeated. In the 1884 Sudan expedition he was present in the engagements of El Teb (where he was wounded) and Tainai. He served throughout the Nile expedition for the relief of Gordon (1884-5) with the Light Camel Regiment, and took part in the operations of the desert column, including the engagement at Abu Klea Wells (Feb. 16 and 17, 1885). In the Boer war (1899-1902), Colonel Brabazon was first given the command of the 2nd Cavalry Brigade, and later that of a division of Imperial Yeomanry. He retired from the army in 1901.

Brac, Dalmatia. See BRAZZA.

Bracara Augusta, Portugal. See BRAGA.

Bracciano, tn., prov. Rome, Italy, 27 m. N.W. of Rome, on the S. side of the Lake of Bracciano. Its principal feature is the vast baronial castle, built by one of the Orsini in 1480, and since 1696 a possession of the Odescalchi. Pop. 4,000.—The LAKE OF BRACCIANO, known to the ancients as *Lacus Sabatinus*, fills an extinct crater, and lies 540 ft. above sea-level, but has a depth of over 800 ft., or 260 ft. below sea-level. It measures about 20 m. in circumference, and has been famous for its fish since Roman times.

Braccio, or FORTEBRACCIO, whose real name was ANDREA DA MONTONE (1368-1424), Italian condottiere, or captain of mercenaries, was born at Perugia. Banished from Perugia in 1400, he aided, in 1408, Ladislaus, king of Naples, in taking the city, of which, on the death of Ladislaus, he assumed (1416) control. In 1416 he made himself master of Rome for over two months. In 1421 he espoused the cause of Joanna II. of Naples, surprised Capua, and entered Naples in triumph. His ambition awakened the suspicion of Joanna, who joined Anjou and Sforza against him. At the siege of Aquila Braccio was wounded, and died three days afterwards.

Bracciolini, FRANCESCO (1566-1645), Italian poet, born at Pistoja, enjoyed the patronage of Cardinal Maffeo Barberini, who became Pope Urban VIII. He produced an imitation of Tasso, in the *Croce Racquistata* (1605-11), which narrates the war of the Emperor Heraclius against the king of Persia for the recovery of the cross. In the burlesque poem, *Lo Scherno degli Dei* (1618-26), the ancient gods are parodied after the manner of Tassoni. There are humour and life in this work, but the matter is not adequate to fill twenty cantos. Among Bracciolini's minor works the *Poesie Giocose* (1626) is the best. See G. Cegani, *F. B. e il suo Poema*, in *Ateneo Veneto* (1883, vol. ii.); M. Menghini, preface to our poet's *Psiche* (1889); and Barbi, *Notizia della Vita e delle Opere di F. Bracciolini* (1877).

Brace, CHARLES LORING (1826-90), American philanthropist and author, born at Litchfield, Connecticut. After extensive travels in Europe he settled (1852) in New York, and devoted himself to ameliorating the condition of the lowest classes by founding the Children's Aid Society and other

organizations. His most important publications are *Hungary in 1851* (1852); *Home Life in Germany* (1853); *The Norse Folk* (1857); *The Races of the Old World* (1863); *The New West, or California in 1867-8* (1869); *The Dangerous Classes of New York* (1872); *Gesta Christi* (1882); *The Unknown God* (1889). See *Life* by his daughter (1894).

Bracebridge, tn. and summer resort, Muskoka co., Ontario, Canada, 98 m. N. of Toronto, on the Muskoka R.; manufactures lumber, flour, and woollen goods. Pop. 2,500.

Bracegirdle, ANNE (? 1663-1748), English actress, made her debut in *The Orphan* at the Duke's Theatre in Dorset Garden, London, and from 1693 appeared in the Theatre Royal as Lucia at Shadwell's *Squire of Alsatia* (1688), and with Betterton at the Lincoln's Inn Theatre as Angelina in Congreve's *Love for Love* (1695); she created Belinda in Vanbrugh's *Provoked Wife*, and Almeria in Congreve's *Mourning Bride*. She was at home in tragedy as well as in comedy, and her professional career was a long series of triumphs until she retired from the stage in 1707, eclipsed by Mrs. Oldfield. See Cibber's *Apology* (1822), and W. Clark Russell's *Representative Actors* (1875).

Bracelet. (1.) An ornamental band worn on the arm or wrist. (2.) An ornament worn on the neck and the jewelled covers of caps. (3.) A fetter or gyve. (4.) A piece of armour covering the arm. The three last meanings are unusual. In the stricter sense, bracelets or armlets are of various types. Prehistoric bracelets (*armillæ*) of gold and bronze are found, both penannular, and with trumpet-shaped ends, the gold generally plain, the bronze most frequently richly decorated with zoomorphic designs, and some-

times set with enamels. Some of the latter were also arranged as a coil down the arm. The Norso or Viking type consisted of large bracelets of finely-twisted silver terminating in knobs or in hooks. A special variety of bracelets of bronze is the massive armlet of 'late-Celtic' type peculiar to Scotland, an enrichment of the coiled serpent variety. Bracelets of chain-work were worn by Hebrew women. Enamelled bracelets of various metals prevailed in Egypt. In the regalia of the Mogul emperors of India was a unique pair of bracelets set with diamonds of univalued beauty and costliness. Bracelets were worn by both men and women among the ancient Germanic tribes and among the Romans, and were bestowed upon distinguished warriors and others as a mark of honour. But since about the end of the 12th century the wearing of bracelets has been chiefly confined to women. Horn and mother-of-pearl, besides copper and brass, have been used for bracelets; and in Anglo-Saxon tombs bracelets have been found made of beads of vitreous paste strung together. See Bartholinus' *De Armillis Veterum* (1676).

Brachial Artery, the artery carrying the blood to the arm. It is a prolongation of the axillary artery. It begins at about the lower border of the armpit, and ends by dividing into the radial and ulnar arteries just below the bend of the elbow, lying, in its upper part, in a position corresponding to that of the inner seam of a sleeve, and gradually sweeping outward to the front of the elbow joint. When hæmorrhage occurs below the armpit, and cannot be stopped by direct pressure on the bleeding spot, forcible pressure should be applied on the line of the inner seam of the sleeve, high up on the arm; this compresses the

brachial artery against the bone (humerus). This vessel gives off several branches before dividing below the elbow.

Brachial Plexus, the network of nerves which supply the arm. It is formed by the four lower cervical nerves and part of the first dorsal, and lies between the root of the neck and the axilla or armpit, where it breaks up into several branches.

Brachiopoda ('arm-footed'), or LAMP-SHELLS, an interesting group of animals which, owing to the presence of two calcareous shells, were once placed in the group Mollusca near bivalves. They received their name from the fact that the two spirally-coiled arms round the mouth, which are very characteristic structures, were compared with the foot of molluscs—a comparison long since shown to be erroneous. Brachiopods in no way resemble molluscs; even the shell has nothing more than a superficial resemblance to that of bivalves. Their exact position is not very certain, but they are now placed in proximity to the Polyzoa or Bryozoa, which they resemble in many points. As fossils, brachiopods are numerous, especially in the old rocks; but there are relatively few species now extant. To distinguish between the shells of brachiopods and bivalves, the following points should be noticed. In a bivalve the two valves are usually equal, but each valve is unsymmetrical about the median line; in a brachiopod the valves are of unequal size, but each valve is symmetrical about the median line. Where the soft parts are present, the absence in the brachiopod of foot, gills, and mantle, and the presence of 'arms,' are diagnostic. In British waters *Terebratulina* and *Crania* not infrequently occur.

Brachycephalic. See ANTHROPOLOGY.

Brachyura ('short tails'), a name given to those decapod crustaceans in which the tail is short and bent beneath the body—e.g. the common edible crab—in opposition to the *Macrura*, or long-tailed forms, like lobster and prawn. Though the distinction seems at first sight an easy and satisfactory one, it is now often abandoned: because, in the first place, there exist transitional forms between the two states; and, in the second, the brachyurous habit is merely an adaptation to life on the sea-bottom, and has been independently acquired by many different forms. The squat lobsters (*Galathea*), which are macrurous forms, are closely related to the short-tailed porcelain crabs (*Porcellana*). The anomalous hermit crabs (*Paguridae*), with their lank, uncalcified tails, are nearly related to the short-tailed stone crab (*Lithodes*), and so on. In brief, the scientific term *Brachyura* is as devoid of precision as its English equivalent, the word 'crab.' See DECAPODA and CRAB; T. R. Stebbing's *Hist. of Crustacea*, in the 'International Science Series' (1893); and the chapters on Decapods in *Life by the Seashore*, by M. I. Newbigin (1901).

Brackel, or BRAKEL, tn., in Prussian prov. of Westphalia, 20 m. E. of Paderborn. Pop. 6,700.

Bracken, or COMMON BRAKE, FERN (*Pteris aquilina*), is the most common of all British ferns, and of almost world-wide distribution. Its stem is a wide-spreading underground structure, covered with fine brown hairs, and giving off roots in all directions; this stem sends up each year a single leaf or frond, which may vary in height from six inches to twelve feet, according to the conditions in which the plant is growing. The spore cases occur in lines along the margin of the pinnae, thus distinguishing the bracken

from all other British ferns. These fronds are used in large quantities for bedding cattle, and even in some instances for thatching stacks and houses; and the subterranean stem has been employed as an article of food, on account of the large quantity of starch and mucilage which it contains.

Brackenbury, CHARLES BOOTH (1831-90), English soldier, was born in London; served in the Crimea in 1855-6. In 1860 he was appointed assistant instructor in artillery at the Royal Military Academy, and in 1864 assistant director of military studies. He acted as military correspondent of the *Times* in the Prusso-Austrian (1866), the Franco-German (1870-1), and the Russo-Turkish (1877-8) wars. Brackenbury was also superintendent of Waltham gunpowder factory, and director of the Artillery College. He was the author of many works and papers on military affairs, especially tactics, including *The Constitutional Forces of Great Britain* (1869), *Foreign Armies and Home Reserves* (1871), and *Field Works* (1888).

Brackenbury, SIR HENRY (1837), English soldier, was born at Bolingbroke, Lincolnshire; served in the Indian mutiny (1857-8); was attached to the British National Society for Aid to Sick and Wounded in the Franco-German war (1870-1); served in the Ashanti war (1873-74), and the Zulu war (1879-80), where he acted as chief of the staff. In 1882 he became assistant under-secretary for Ireland. In the Sudan expedition of 1884 he commanded the river column, and was promoted to be major-general for distinguished service in the field. From 1886 to 1891 he acted as director of military intelligence; from 1896 to 1899 he was president of the ordnance committee, and direc-

tor-general of the ordnance from 1899 to 1904. K.C.B. in 1894; K.C.S.I. in 1896; P.C. in 1904. He has written *The Last Campaign of Hanover* (1870), *The Tactics of the Three Arms* (1873), *Narrative of the Ashanti War* (1874), *The River Column* (1885), and *Some Memories of My Spare Time* (1909).

Bracklesham Beds, richly fossiliferous beds of mud and clay, belonging to the Middle Eocene, exposed in the cliffs at Bracklesham in Sussex, and well known also in the Isle of Wight. They form a sub-group of the Bagshot Beds.

Brackley, munic. bor. and mrkt. tn., Northamptonshire, England, on the Ouse, 7 m. N.W. of Buckingham; manufactures lace, and boots and shoes. Pop. 2,500.

Brackwede-Brock, tn., Prussian prov. of Westphalia, 3 m. S.W. of Bielefeld. Pop. 9,600.

Bract, a term applied in botany to any leaf which bears in its axil (the angle between itself and the stem from which it arises) a flower, or a branch which terminates directly in a flower.

Bracteates (Lat. *nummi bracteati*, from *bractea* = a thin plate of gold-leaf), in ancient Scandinavia, large, flat gold ornaments, shaped like coins, and bearing the impress of fanciful figures, with runic inscriptions. They are very thin, stamped only on one side, vary in size from $\frac{1}{4}$ inch to $3\frac{1}{2}$ inches, and are made of very pure gold. The name is also given to the large, thin pennies (*denarii*), stamped on one side only, which were struck in Germany between the middle of the 12th and the middle of the 15th century.

Bracton, or BRATTON, HENRICUS DE (d. c. 1268), English ecclesiastic and judge, was born in Devon or Somerset. He was archdeacon (1264-5) of Barnstaple and chancellor of Exeter Cathedral, where he lies buried. He was also one of the royal judges

(1245) who went on circuit in the later years of Henry III.'s reign. His comprehensive treatise, *De Legibus et Consuetudinibus Anglie*, one of the greatest of European mediæval law books, was written just as the victory of the royal courts over their rivals, the feudal and the local courts, was being completed. Bracton did much to bring about the victory, and to establish one 'common law' for the whole of England. Two editions of the book were printed, in 1569 and 1640. See also Sir Travers Twiss's edition (Rolls Series, 1878-83); Professor Maitland's edition of the *Notebook* (1887), and his admirable account of Bracton (Selden Series, 1895); and Güterbock's *Bracton* (1866).

Braddock, bor., Allegheny co., Pennsylvania, U.S.A., situated on the Monongahela R., 10 m. S.E. of Pittsburg. The principal manufactures are iron and steel. General Braddock was defeated and killed here (1755). Pop. 20,000.

Braddock, EDWARD (1695-1755), British soldier; born in Perthshire, Scotland; arrived in Virginia, February 20, 1755, to assume the command in the campaign against the French settlers. Having organized an army of regulars and provincials, among whom was George Washington, Braddock marched against Fort Duquesne. After crossing the Monongahela with 1,200 chosen men, the army fell into an ambush of French and Indians, and was defeated with great slaughter, Braddock himself being wounded, and dying four days later (July 13, 1755). See *Memoirs of Hist. Soc. of Pennsylvania*, vol. v.; Winthrop Sargent's *Hist. of the Expedition against Fort Duquesne* (1855); Parkman's *Montcalm and Wolfe* (1884).

Braddon, MARY ELIZABETH (1837). English novelist, daughter of a London solicitor, was born in London. In 1860 the Strand

Theatre produced her comedietta *Loves of Arcadia*. In 1861 she published a volume of verse entitled *Garibaldi, and other Poems*. About this time also a young printer of Beverley commissioned her to write for his weekly newspaper, for ten pounds, a serial, which was her first novel, *The Trail of the Serpent*, originally published as *Three Times Dead*. But it was *Lady Audley's Secret* which made her name as a novelist (1862). This was followed by the equally popular *Aurora Floyd* (1863), *Eleonor's Victory* (1863), and *Henry Dunbar* (1864). Her characteristics are a well-conceived plot, and an endless supply of the stock-in-trade of melodrama. She has written more than fifty novels. Her later works include *Ishmael* (1884), *Wyllard's Weird* (1886), *London Pride* (1896), *The Infidel* (1900), *The Conflict* (1903), *The Rose of Life* (1905), *Her Convict* (1907), *Our Adversary* (1909), and *Beyond these Voices* (1910). Miss Braddon married Mr. John Maxwell, publisher, in 1874.—Herson, Mr. W. B. MAXWELL, is also a novelist, and the author of *The Ragged Messenger*, *Virien*, *Hill Rise*, etc.

Bradfield, civil par. (34,780 ac.), W. Riding, Yorkshire, England, 6 m. N.W. of Sheffield; contains many reservoirs for water supply of Sheffield. In 1864 Old Dale Dyke reservoir burst, and the 'Sheffield flood' drowned 238 persons. Pop. 8,000.

Bradford ('broad ford'), (1.) City, munic. and co. bor., W. Riding, Yorkshire, England, on Bradford Beck, a trib. of the Aire R., and on a branch of the Leeds and Liverpool Canal, 9 m. W. of Leeds. There are seven public parks (Poel, Lister, Horton, Bowling, Wibsey, Harold, and Bradford Moor—total area, 300 ac.); and Baildon Moor (670 ac.) is also available for recreation. The principal buildings are the cor-

poration buildings, the hall, the covered market, a technical school, Cartwright Memorial Hall, Central Baths, Independent college (1888), and grammar schools (boys and girls). Bradford is, and has been since 1798, when the first worsted mill was erected, the chief seat in Britain of the worsted, yarn, and soft goods industry. Velvets, plush and woollen coatings, are also made; and there are also iron mines and works, engineering shops, and collieries in the town and vicinity. The chief iron works are at Bowling and Low Moor. Bradford was twice besieged during the civil war (1642 and 1643). It returns three members to Parliament. Pop. (co. and munic. bor.) 300,000. (2.) City, McKean co., Pennsylvania, U.S.A., on an affluent of the Allegheny R., 66 m. S. of Buffalo. The dist. is one of the richest in the country in petroleum. Pop. 20,000.

Bradford, SIR EDWARD RIDLEY COLBOURNE, G.C.B., K.C.S.I. (1836), son of the rector of West Meon, Hants; entered Madras army (1853), and saw much service. He commanded the operations against the Thugs and Dacoits, and for some time was secretary in the political and secret department of the India Office. From 1890 to 1903 he was commissioner of police of the metropolis (London).

Bradford, JOHN (1510-55), Protestant preacher and martyr, was born in Manchester, England; educated at Cambridge, converted to Protestantism by Latimer, and appointed (1553) royal chaplain to Edward VI., after whose death he was tried before Gardiner and Bonner, condemned as a heretic, and burned at Smithfield. He wrote many theological treatises, published in the collections of the Parker Society (1848-53). See W. Stevens's *Life of Bradford* (1832).

Bradford, WILLIAM (1590-1657), Pilgrim Father, sailed from Southampton in the *Mayflower* with the first band of pilgrims (Sept. 5, 1620) for Virginia, but through stress of weather landed at Plymouth, U.S.A.; and of this settlement Bradford, in 1621, became governor. He wrote a *History of Plimouth Plantation* (first pub. 1856).

Bradford Clay, a marly stratum found above the Great Oolite at Bradford in Wiltshire, England, in which crinoids are numerous, showing that the upper surface at one time was the bottom of a sea, where the crinoids had existence till they were overwhelmed by a layer of mud.

Bradford-on-Avon, par. (10,074 ac.) and mkt. tn., Wiltshire, England, on the Avon, 6 m. E.S.E. of Bath. Holy Trinity Church contains monuments of the 13th century; but the most interesting ecclesiastical building is the unique little Saxon church of St. Lawrence, built by Aldhelm in the 8th century. The manufacture of kerseymerie is said to have originated here in England. Rubber is now the staple industry. Pop. 4,500.

Brading, par. (8,273 ac.) and tn., Isle of Wight, Hampshire, England, 4 m. S. of Ryde. Some valuable Roman remains have been found near the town. Leigh Richmond, author of the *Annals of the Poor*, was curate here (1797-1805), and his heroine, Little Jane, rests in the old churchyard. Pop. 1,800.

Bradlaugh, CHARLES (1833-91), social and political reformer, son of a solicitor's clerk, was born in London. From an early date he was a strong advocate of the secularist and advanced radical causes, writing and lecturing under the name of 'Iconoclast,' and he took a prominent part in all popular movements—the Reform League agitation, Irish

Church reform, and was leader of the National Secular Society and the Land Law Reform League. His organ, *The National Reformer* (1862), was the subject of a futile government prosecution, which led to the repeal of statutes still fettering the liberty of the press. In 1870 Lord Chief-Justice Cockburn decided the oaths question in courts of justice in Bradlaugh's favour. In 1872 he published *The Impeachment of the House of Brunswick* (7th ed. 1880), and subsequently lectured in America and the colonies. In 1876 the republication by Bradlaugh and Mrs. Annie Besant of an old pamphlet, *The Fruits of Philosophy*, which advocated the restriction of progeny, led to a sentence of six months' imprisonment and a fine of £200; but the sentence was reversed on appeal. In 1880 Bradlaugh became M.P. for Northampton, and a struggle ensued with the House of Commons on the question of the parliamentary oath, which Bradlaugh, an atheist by conviction, refused to take. Afterwards he offered to take it (avowedly as a mere form) or to affirm, but the House would not allow him to do either. He was re-elected in 1881, 1882, and 1883, but was still excluded from his seat. Once more elected for Northampton in 1885, he was at length permitted to take the oath and his seat in January 1886. Bradlaugh died on January 30, 1891, three days after the House of Commons had expunged the resolution passed against him in 1880. See Bradlaugh's *Autobiography* (1873); the *Biography of Charles Bradlaugh*, by A. S. Headingley (1880); *Charles Bradlaugh*, by H. B. Bonner and J. M. Robertson (1895).

Bradley, Andrew Cecil (1851), was fellow of Balliol (1874), professor of English literature, Glasgow University (1889-1900),

and professor of poetry at Oxford (1901-6). He is one of the subtlest and most brilliant of modern critics. He has published *Shakespearean Tragedy* (1904), and *Oxford Lectures on Poetry* (1909).

Bradley, Francis Herbert (1846), fellow of Merton College, Oxford, and philosophical writer. Chief works: *The Presuppositions of Critical History* (1874); *Ethical Studies* (1876); *The Principles of Logic* (1883); *Appearance and Reality* (1893).

Bradley, George Granville (1821-1903), dean of Westminster from 1881 to 1902, was a pupil of Dr. Arnold at Rugby, and a student at University College, Oxford, under Dean Stanley, winning the chancellor's prize for the Latin essay (1845). Elected a fellow of his college in 1844, he was assistant master at Rugby from 1846, and in 1858 was appointed headmaster of Marlborough College, where he advocated the teaching of natural sciences and modern languages, in addition to the subjects of the old curriculum. In 1870 he left Marlborough to become master of University College, Oxford; and in 1881 he succeeded Stanley as dean of Westminster, which office he resigned in 1902. In addition to two volumes of *Lectures on the Book of Job* (1881; new ed. 1888) and the *Book of Ecclesiastes* (1885; new ed. 1898), he published a revised edition of Arnold's *Introduction to Latin Prose* (1884), *Recollections of A. P. Stanley* (1883), *Aids to Writing Latin Prose Composition* (1884), and, with Mr. R. E. Prothero, *Life of Dean Stanley* (1893). His daughter is Margaret L. Woods, novelist and poet.

Bradley, Henry (1845), English lexicographer, was born in Manchester, and became a clerk and foreign correspondent in a commercial house in Sheffield. In 1884 he went to London, and contributed to the leading literary

journals, and was three times (1891-3, 1900-1, and 1909-10) elected president of the Philological Society. Since 1889 he has been joint-editor with Dr. Murray (now Sir James) of the *New English Dictionary* (Oxford). He is the author of *The Story of the Goths* (1888), *The Making of English* (1904), and has edited numerous English texts, notably Caxton's *Dialogues* (1900), for the Early English Text Society.

Bradley, JAMES (1693-1762), English astronomer-royal. His chief astronomical researches were conducted from the beginning at Wanstead in Essex, of which his uncle, the Rev. James Pound, an astronomer of some repute, was rector. In 1721 he was appointed to the Savilian chair of astronomy at Oxford, and in 1729 lecturer on experimental philosophy; and in 1742 succeeded Halley as astronomer-royal. Bradley's reputation rests on his accuracy as an observer; his discovery of the 'aberration of light,' by which he accounted for the apparent displacement of the fixed stars; and his discovery of the nutation of the earth's axis, due to the moon's unequal action on the equatorial parts. These discoveries, by making exact knowledge of the position of the fixed stars possible, laid the foundation of modern observational astronomy. See Rigaud's *Memoirs* in his edition of Bradley's *Miscellaneous Works* (1832).

Bradshaw, GEORGE (1801-53), originator of railway guides, began life as an engraver in Manchester (1821). In 1839 appeared *Bradshaw's Railway Time-table*, at sixpence, enlarged and changed next year to *Bradshaw's Railway Companion*. The monthly *Railway Guide* dates from December 1841. His other publications include the *Continental Railway Guide* (begun Paris, 1847) and the *Railway Directory and Shareholders' Guide* (1849).

Bradshaw, HENRY (d. 1513), English poet, was a native of Chester and monk of the Benedictine monastery of St. Werburgh's, and passed his course in theology at Gloucester College, Oxford; author of the Latin *De Antiquitate et Magnificentia Urbis Cestrie*, and a *Chronicon and Life of St. Werburgh* in Chetham verse, reprinted in the Chetham Society's publications, vol. xv., ed. E. Hawkins (1848).

Bradshaw, HENRY (1831-86), English scholar, antiquary, and librarian, was born in London, and educated at Eton, which he left as captain of the school, entering King's College, Cambridge, as a scholar in 1850. In 1853 he was elected to a fellowship of his college, and after acting for some time as a schoolmaster in Dublin he returned to Cambridge in 1856, where he became an assistant in the university library. He resigned his post in 1858, but in 1859 he rejoined the staff, and for many years devoted himself to the compilation of a catalogue of the MSS. in the library. In 1857 he unearthed the MS. of the famous *Book of Deer*, and rediscovered the Vaudois MSS. (1862), containing the earliest remains of the Waldensian language and literature. In 1863 he assisted in the exposure of Simonides, the forger of the Codex Sinaiticus, discovered by Tischendorf in 1859. He also brought to light (1866) two previously unknown works ascribed to Barbour, *The Siege of Troy* and *Lives of the Saints*. Bradshaw's work was very varied. Celtic research, papers on English, German, Dutch, and Irish bibliography, and Chaucer studies, all occupied his attention. His *Collected Papers* were published in 1889, a *Memoir* by G. W. Prothero having appeared in 1888.

Bradshaw, JOHN (1602-59), English religioist, son of a well-to-

do country gentleman in Cheshire, was judge of the sheriff's court in London (1643-9) and chief-justice of Chester from 1647, but was comparatively unknown when called upon to preside over the commission for the trial of King Charles (1649), where he is accused of acting with undue harshness. President of the Council of State from 1649 until its dissolution by Cromwell in 1653, he was a strong opponent of Cromwell's later policy. Under Richard Cromwell he was again president of the Council of State. After the restoration (1661) his body was dug up, hanged at Tyburn, and decapitated.

Bradwardine, THOMAS (? 1290-1349), Archbishop of Canterbury, and one of Edward III.'s chaplains, styled 'Doctor Profundus.' He was entered at Merton College, Oxford, and there delivered those lectures against Pelagianism afterwards expanded into the treatise known as *De Causis Dei contra Pelagium* (ed. 1618). Bradwardine was a strong opponent of the doctrine of works, and a stout upholder of the doctrine of free grace, which he regarded as inextricably bound up with the doctrine of God's foreknowledge. He was canon of Lincoln, chancellor of St. Paul's, and in 1349 was consecrated Archbishop of Canterbury, but died a few weeks later. See Milner's *Church Hist.*, vol. iv. (1810).

Brady, NICHOLAS (1659-1726), divine and poet, born at Bandon, Ireland; became rector of St. Catherine Cree, London, and from 1696 to his death, of Richmond, Surrey. He was chaplain to William, Mary, and Anne. He made a translation of Virgil's *Æneid*, and wrote a play, *The Rape, or the Innocent Impostors* (1692); but his name survives only in connection with the 'Tate and Brady' metrical version of the Psalms (1696), once popular, but now disused.

Bradycardia, an abnormal slowness of pulse, which may be either peculiar to the individual, or due to disease, exhaustion, pain, poisoning, or other cause.

Bradypus. See SLOTH.

Braemar, vil. and dist. in pars. of Braemar and Crathie, S.W. Aberdeenshire, Scotland; the vil. Castleton of Braemar is 16 m. W. by s. of the Ballater terminus of the Deeside Ry. The district is exceedingly picturesque, and contains several lofty peaks of the Cairngorm group. Balmoral Castle is close to Crathie. Pop. of Braemar and Crathie, 1,500.

Braga. (1.) Administrative dist. in the Portuguese prov. of Entre Minho e Douro. Area, 1,040 sq. m. Pop. 360,000. (2.) The ancient *Bracara Augusta*, tn. and archiepisc. see of Portugal, in the dist. of Braga, 33 in. N.N.E. of Oporto. It is mediæval in appearance, still surrounded by walls, and has picturesque old houses, an imposing cathedral, citadel, and archiepiscopal palace. It manufactures cutlery, firearms, and jewellery. Pop. 25,000.

Bragança. (1.) Administrative dist. in the Portuguese prov. of Traz-os-Montes. Area, 2,513 sq. m. Pop. 185,000. (2.) City and episc. see of Portugal, cap. of the prov. of Traz-os-Montes; stands on a treeless plateau in the N.E. corner of the kingdom, 9 m. from the Spanish frontier. It is overlooked by a fortified castle, the cradle of the recently deposed dynasty of Portugal. The people are engaged in the silk industry. Pop. 5,500. (3.) Town and seapt., Para, Brazil, 120 m. N.E. of Belem. It is an agricultural centre. Pop. 18,000. (4.) Town, prov. São Paulo, Brazil, 50 m. by rail N. of São Paulo, with numerous sugar mills, and trade in pigs and cattle. Pop. 10,000.

Braganza, HOUSE OF, the royal family of Portugal. See PORTUGAL—History.

Bragg, BRAXTON (1817-76), American Confederate general, was born in Warren co., N. Carolina. When the civil war broke out, Bragg was made (1861) commander-in-chief of all the state troops in Louisiana. In February 1862 he became a major-general, with his headquarters at Mobile, in command of the second division of the Confederate army, the centre of which he led at the battle of Shiloh. He was next appointed (June 1862) commander of the department of the Mississippi. In August he marched northward through Tennessee and captured Munfordville, with 4,000 prisoners; but the place was retaken by General Buell, who also defeated him at Perryville (Oct. 8). He was again defeated at Murfreesboro (Dec. 31, 1862, and Jan. 2, 1863); but in September 1863 he won a brilliant but barren victory for the Confederates at Chickamauga. In November of the same year he was decisively defeated by General Grant at Chattanooga, and in December he was relieved of his command. In 1864 he was appointed military adviser to Jefferson Davis. His brother, THOMAS BRAGG (1810-72), was successively governor of N. Carolina (1855-59), U.S. senator (1859-61), and Confederate attorney-general (1861-3).

Bragi, or BRAGR, a famous minstrel in the ancient Norse sagas, sometimes called a son of Odin, and esteemed as a god. His name is identified with eloquence.

Braham, JOHN (?1774-1856), tenor vocalist, born in London of Jewish parents (his name was really Abraham), and made his debut at Covent Garden in 1787. In 1796 he was engaged for Drury Lane, and next year for the Italian opera. After studying and singing in Italy and Austria, he reappeared at Covent Garden in 1801, and composed the music

of his own part for several operas. His subsequent career was one of continuous success; indeed, he was without a rival in theatre and concert room. He was the original Max in Weber's *Der Freischütz* (1824), and the original Sir Hün in *Oberon* (1826). His voice had great compass, and his falsetto was exceptionally fine. He composed numerous songs and duets, some of which, such as *All's Well* and *The Death of Nelson*, have retained their popularity.

Brahe, PER, THE YOUNGER (1602-59), Swedish soldier and administrator; fought in Germany (1626-31) in the Thirty Years' war; distinguished himself greatly as governor-general of Finland (1637-40 and 1648-54), where, in 1640, he founded the university of Åbo (statue near the cathedral); and served on the councils which governed Sweden during the minority of Queen Christina (1641, etc.) and Charles XI. (1660, etc.). See *Tigerstedt's Administration Fennice Patri Brahei* (1846), and *Ur Per Brahes Brefväxling* (1880-8).

Brahe, TYCHO or TYGE (1546-1601), Danish astronomer, born at Knudstrup in S. Sweden (then a province of Denmark). An eclipse of the sun in 1560 directed his mind to astronomical study. In 1572 he discovered a new star in Cassiopeia. Down to this period he had resided mostly in Germany; but in 1576 Frederick II., the Danish king, helped him to build and equip in an efficient way the observatory of Uraniborg, on the little island of Hven in the Sound, north of Copenhagen. There he laboured until 1597, when intrigues compelled him to carry his instruments to Germany; and in 1599 he was invited to Prague by the Emperor Rudolph II. There Brahe had for a fellow-worker the famous Kepler, but died two years later. Tycho Brahe held

that the planets moved round the sun, and the sun round the earth. This hybrid theory was expounded in the second volume of his *Astronomiæ Instauratæ Mechanica*, printed in 1598 (new ed. 1901). The first volume of the work, containing a dissertation on the star of 1572, was published by Kepler in 1602. Tycho Brahe first assigned to comets their position in interplanetary space. He discovered the variation and annual equation of the moon, investigated precession, and introduced a correction for refraction. His observatory of Uraniborg was excavated in 1901. See *Lives* by Gassendi (in Latin, 1655) and Dreyer (1890):

Brahma, the creator of the universe, according to Brahmanism; the first person of the Trimurti, or trinity, of Hinduism. The Brahmans are his peculiar offspring, and the sole exponents of his will. See BRAHMANISM.

Brahmanabad, ruined city in Haidarabad dist., Sindh, India, 45 m. N.E. of Haidarabad. It stood on a former course of the Indus, and was strongly fortified.

Brahmanas, those prose commentaries on the Vedas which describe the elaborate ritual to be observed by Brahmans (Hindu priests) in sacrifice and worship. The oldest is supposed to have been written about the 7th century B.C.

Brahmanbaria, munic. tn. in Tipperah dist., Eastern Bengal, India, 50 m. N.E. of Dacca. Pop. 20,000.

Brahmani, riv. in Chota Nagpur, Bengal, India; traverses Chota Nagpur and Orissa. It is famous in Hindu lore as the traditional scene of the love of the sage Parásara and the mother of Vyasa, reputed compiler of the *Vedas* and the *Mahābhārata*.

Brahmanism or BRAHMINISM. A slight variation of the opening words of the Gospel of St. John

serves to express the philosophy of Brahmanism: 'In the beginning was the Word, and the Word was Brahma'—a splendid universal monism. 'The Word was made flesh,' and Brahma, the creator, stood self-evolved. The doctrine of the Trimurti—the trinity, Brahma, Vishnu, and Siva—was a subsequent development; and it is at this point—in contact, doubtless, with contemporary faiths and modes of thought—that Brahmanism merges into the complex system of theology called Hinduism. From the head of Brahma sprang the holy Brahman—the twice born—establishing a line of priestly lawgivers, who, six centuries before Christ, changed a philosophical system into a religious ordinance, of which Brahmans became the custodians and exponents. Of inferior birth to the Brahmans were the Kshatriyas, princes and warriors, who are alleged to have issued from the arms of Brahma; the Vaisyas, husbandmen, who proceeded from the creator's thighs; and the Sudra, begotten of his feet. The rest of mankind were outcasts. This was the origin of caste, that powerful and rigid distinction which has survived the passive antagonism of successive religious revivals and the combative efforts of missionaries of all creeds. Preceded by Vedism, the ancient faith of the Indian Aryan, and lost in the Hinduism to which it gave birth, it is difficult to indicate the lines which separate Brahmanism from the one or the other. Its fundamental doctrine was spiritual pantheism, but there is no evidence that either idol-worship or human sacrifice in any form had a place in the Brahmanical system. See Monier Williams's *Brahmanism and Hinduism* (1887), and his *Indian Wisdom* (1893). In these all the most important authori-

ties on the subject are mentioned. See HINDUISM, VEDISM.

Brahmapurana. See PURANAS.

Brahmaputra (lit. 'son of Brahma'), one of the largest rivers of India. Its source is the Kubitسانپو, or Tsanpo, which flows from an enormous glacier on the N. side of the most northerly parallel range of the Himalayas, near Lake Manasarowar, in W. Tibet, the altitude being between 15,000 and 16,000 ft. It flows E. for about 1,000 m. on the plateau of Tibet; then turning S.E. penetrates the Himalayas, under the name of Dihong, and descends to the valleys of Assam. There it flows in a S.W. and S. direction, and after partial confluence with the Ganges enters the Bay of Bengal in an expansive delta. Its length is about 1,800 m. During the rains the Brahmaputra floods and fertilizes hundreds of square miles of country. It is navigable for steamers to Dibrugarh, 800 m. from the sea. Here the discharge of the river at its lowest is said to be 116,115 cub. ft. per second. See Sven Hedin's *Transhimalaya* (1910).

Brahma Samaj ('the Society of God'). The most remarkable religious revival of modern times in India has been that of the Brahme Samaj, or, as it is sometimes called, Arya Samaj. Its founder, Rajaram Mohun Roy, born in 1774, had studied the philosophy of Hinduism at Benares and of Buddhism in Tibet. Denouncing *sati* and idol-worship, he sought to establish an eclectic system of practical morality. Although undoubtedly influenced by Christianity and Islamism, it is important to note that the Hindu Unitarian Church which he founded (about 1830) was a return to ideal Brahmanism—the worship of a supreme deity, the essence of the universe. Rajaram was born a Brahman, and died a Brahman. After his death

the movement received a certain impetus (about 1842) as the Adi Samaj (New Church), under the leadership of one Debendra Nath Tagore; and Debendra Nath was followed by Keshub Chandra Sen (1838-84). Inspired by Sen's religious fervour and lofty eloquence, the Adi Samaj marked a distinct change of creed. God the Father was substituted for the Vedic definition of the Creator, and in the establishment of the 'brotherhood of man' the new church shook off all vestige of Brahmanism, and grew and prospered. A false step checked its career, and disappointed those who thought that they saw in this last development an approach of Hindu Unitarianism towards the theism of the West. Keshub Chandra Sen, who had repeatedly and strenuously opposed infant marriage, sanctioned the nuptials of his own daughter, at the age of fourteen, with the maharajah of Kuch Behar. In the succeeding disruption (1878) the mass of his congregation took refuge with the dissenters, the Sadharana (general) Brahma Samaj of the present day. In a conservative reaction this Samaj fell back on Vedic authority for the theism which it professes. Allied to this movement of religious thought in India are other forms of Vedic theisms, among which may be mentioned the Prarthana Samaj (Prayer Society) of Bombay, and the Arya Samaj (Aryan Society): the latter, however, is rather a political organization than a religious body, and of late has come prominently forward as a movement less to reform Hinduism than to rouse it into active resistance to the alien influences, both Christian and Mohammedan, which threaten to denationalize it. Politically it is strongly aggressive, and its attempt to check enlistment and even to tamper with the loyalty of certain regi-

ments is no secret. See Ghose's *Works of Ramnohan Roy* (1888), *Mozoomdar's Life and Teachings of Keshub Chandra Sen* (1887), Max Müller's *Ramakrishna* (1899), and *East and West* (1904-5).

Brahman Ox. See ZEBU.

Brahms, JOHANNES (1833-97), an eminent composer and pianist, born at Hamburg. His musical education, begun by his father, was continued by Marxsen of Altona. He began the study of composition at a very early age, but was first known to the public as a pianist. Brahms settled in Vienna in 1861, but after some years consecrated his energies to composition. As his productions became known, it was acknowledged that he was one of the greatest composers of modern times. In the development of his ideas the serious purpose and lofty aim of his work preclude any pandering to mercetricious devices, and the superlative excellence of his compositions is only revealed to the trained intelligence of the cultured musician. Brahms wrote in practically every branch but the dramatic. His symphonies, overtures, and other orchestral compositions; his great choral-orchestral works, such as the *Deutsches Requiem* (op. 45), the *Song of Destiny* (op. 54), etc.; also his productions in the domain of chamber music in all its forms, take rank with the greatest creations in their several classes of composition. His concertos, Hungarian dances, etc., for piano, and his violin concerto (op. 77, written for Joachim), are works of outstanding merit; while as a vocal composer in every form, and especially as a song-writer, Brahms occupies a position of almost unique distinction. As a pianist he showed great intellectual power. See his *Correspondence* (1876-97), ed. by Kalbeck (Eng. trans. 1909); also *Life by*

May (1905); by Kalbeck (1904, etc.); Hadow's *Studies in Modern Music* (1908); and J. A. Fuller-Maitland's *Brahms* (1911).

Brahui. See BALUCHISTAN.

Braid, JAMES (?1795-1860), Scottish writer on hypnotism, was led to a scientific examination of this subject by La Fontaine's lectures in Manchester (1841), where he practised medicine most of his life. He demonstrated the subjective nature of the phenomena, and their independence of the alleged magnetic influence passing from the operator, and was the first to use the term 'hypnotism.' He wrote *Neurypnology, or the Rationale of Nervous Sleep, considered in Relation to Animal Magnetism* (1843); *Magic, Witchcraft, Animal Magnetism, Hypnotism, and Electrobiology* (3rd ed. 1852); and *Observations on Trance* (1850).

Braidwood, tn., co. of St. Vincent, New South Wales, 140 m. s.s.w. of Sydney; has mining, and trade in timber and dairy produce. Alt. 3,357 ft. Pop. 1,600.

Braidwood, THOMAS (1715-1806), was born in Scotland, and was a teacher of the deaf and dumb in Edinburgh. Encouraged by his success in teaching a pupil, Charles Sherriff, born deaf, and therefore mute, to speak (1760), Braidwood established his academy for teaching the mute, which was visited by Dr. Johnson. The academy was afterwards removed to Hackney, London. See Johnson's *Works* (1806), iv. p. 337; Boswell's *Life of Johnson*.

Braila, tn., Rumania, 12 m. s.s.w. of Galatz, on l. bk. of Danube, and on stato line Galatz-Bucsu. It exports wheat and other cereals, cement, petroleum, etc., to the annual value of about £3,000,000. Before 1883 Braila was a free port. From the end of the 16th to the end of the 18th century it belonged to the Turks. Pop. 60,000.

Braille, LOUIS. See BLIND—*Types and Printing.*

Brain, the organ of thought, sensation, and voluntary movement. It is protected by the skull, between which and the brain are delicate serous membranes (meninges) and a small quantity of fluid (the cerebrospinal fluid), which acts as a water-bed, lessening the shock of any blow. The brain is divided by anatomists into four principal parts—the *cerebrum* (brain proper), the *cerebellum* (Lat. 'little brain'), *pons Varolii* ('bridge of Varolius'), and *medulla oblongata* (Lat. 'oblong marrow'). The cerebrum, or fore brain, is divided longitudinally into two cerebral hemispheres, the right and left, by the great longitudinal fissure. This completely divides it, except where, towards the middle, the two halves are joined by a broad band of white substance (nerve fibres) called the *corpus callosum* (hard body). The surface of each cerebral hemisphere is divided (arbitrarily by anatomists) into four lobes, marked off from one another more or less plainly by fissures of various lengths and curves. These lobes and fissures are named and described in anatomical works for convenience in mapping out the brain, and locating the seats of its functions as far as possible. They have not precisely the same appearance in all brains, nor are the two sides exactly equal; and although useful to the surgeon as guides in operations, the fissures can only be considered very vague landmarks by the physiologist and the psychologist, our knowledge of the action of different parts of the brain being still comparatively rudimentary. Its minute anatomy must be looked for in the anatomical dissecting-room and in text-books. Broadly speaking, the cerebrum is made up of gray matter (cells which in groups

form centres for thought, action, or sensation) and white matter (nerve strands acting as lines of communication). The surface of the cerebrum, in fact of the whole brain, is covered with gray matter—i.e. brain-cells, or centres—and owing to the arrangement of the surface in convolutions, the gray matter dips into the fissures and *sulci*, and so covers a larger area than it would were the brain uniformly smooth. Islands of gray matter are also embedded in the white. It is believed that brain power depends not altogether on the apparent size or the weight of the brain, but partly on the amount of convolution, which is much more marked on some brain surfaces than on others. Weight, however, seems to give a general index of brain power, and this argument is used by some when comparing the brain capacity of man and of woman—the average male brain weighing 49½ ounces, the average weight of the female brain being 41 ounces. Male brains range in weight generally between 46 and 53 ounces; female, between 41 and 47 ounces. Notable examples of heavy brains are Cuvier's (64 ounces) and Dr. Abercromby's (63 ounces). The weight of the brain should, however, be compared with the weight of the individual to whom it belonged. A big head does not necessarily mean a big brain, for that may arise from hydrocephaly. Below a certain size and weight we get microcephaly, and idioey generally goes with these, though some remarkably powerful minds have accompanied exceptionally small heads (e.g. Shelley, Descartes, Foscolo, Donizetti, and Schumann). The cerebrum forms the largest part of the brain, and contains what are commonly spoken of as the 'higher centres'—viz. those for the higher or thinking faculties. This seems beyond question, although many

higher centres cannot be exactly localized; and there are cases on record where a considerable quantity of cerebral brain substance has been injured or destroyed without any obvious psychological result. The whole brain is supplied with blood from the two internal carotid arteries and two vertebral arteries. There is also a circulation of lymph; each cell of gray matter lies bathed in lymph.

Functions of the Cerebrum.—From experiments made by Ferrier, Horsley, and others, those parts of the gray matter (cerebral cortex) concerned in certain actions have been mapped out roughly. The centres for movement of one side of the body lie on the opposite side of the brain. Thus, the right hand is guided by the left cerebral hemisphere. Motor areas—i.e. areas of the gray brain covering, apparently necessary for voluntary movement—have, until recently, been supposed to lie about the fissure of Rolando, on both sides of it; and the respective centres were roughly shown by taking a model of a brain and tracing the outline of a man's figure covering the fissure, head downward, looking backward, and with his arms and legs flexed. It has lately (Sherrington and Grünbaum, *Brit. Med. Jour.*, Sept. 13, 1902) been stated that these motor areas lie entirely in front of the fissure of Rolando, and dip into the fissure, but do not cross it. The report mentioned is illustrated by two photographs, which show what a comparatively small part of the cerebral gray matter seems to be concerned in movement; consequently, what a large portion has its use undefined. The conclusions of Sherrington and Grünbaum were reached by electrical experiments on the brains of anthropoid apes; but, at the same time, Sherrington showed that the

arrangement of fibres in the brain of a child agreed with these conclusions. When an injury to the brain is followed by loss of voluntary movement, the mischief may lie either in the gray matter, or motor area, concerned in that movement, or it may be in the communication fibres, which normally carry the impulse from the motor centre to the part paralyzed. The brain is not bilaterally symmetrical (equal-sided) any more than is the skull, which shows curious asymmetry in many cases, when accurate measurements are taken.

Cerebellum.—The cerebellum, or little brain, lies under the after part of the cerebrum, and is connected with that and other parts of the brain by processes called *crura* (legs). Two join it to the cerebrum, two to the medulla oblongata, and two more form the pons Varolii. The cerebellum is divided into lateral hemispheres, with six lobes lying between. It is formed, like the cerebrum, of gray matter overlying white, with distinct masses of gray also in the interior. Disease of certain parts (lobes) of the cerebellum is believed to affect equilibration (balancing) and co-ordinated (controlled) movements. Some of the nerve fibres (white matter) are believed to be concerned in muscular sense (the sense of weight when exerting a group of muscles in lifting), but the function of the greater part of the cerebellum is unknown.

Pons Varolii.—The pons Varolii is made up mostly of bundles of nerve fibres joining the higher parts of the brain with the medulla. The cerebrum lies above it, the cerebellum behind it, and the medulla oblongata below.

Medulla Oblongata.—The medulla oblongata (sometimes called the spinal bulb) is the expanded upper end of the spinal cord. Of its nerve fibres, some run through

the pons Varolii into the cerebrum, while others run directly into the cerebellum. It must be understood that all connections of the brain with the spinal cord pass through the medulla. In it there is also gray matter, which forms various collections of cells known as the vital centres. These work independently of the will, and govern respiration, the heart's action, the constriction of blood-vessels, swallowing, and secretion of saliva. The last six of the twelve pairs of cranial nerves (nerves emerging from the cranium or skull) arise in the medulla. When the medulla is cut all sensation is lost, because all impulse fails to reach the cerebrum. All voluntary movement is abolished, because the cerebrum cannot send down a message. Death immediately follows, because of interference with the impulses by which heart and lungs are kept in action. It is in the medulla that most of the nerve fibres cross; so that fibres which started on the right side of the brain reach the left side of the spinal cord, and those starting on the left go to the right.

The base of the brain, resting on the base of the skull, the floor of the cavity which holds the brain (or rather on the water-bed of cerebro-spinal fluid), gives off cranial nerves in twelve pairs, each cranial nerve arising from a spot on one half of the brain corresponding to that from which its fellow arises on the other half, and each being traceable to a similar centre; the centre, or directing cells of gray matter, being also in pairs—i.e. in corresponding positions in the cerebrum or cerebellum on either side of a longitudinal mesial line. Certain special centres (not for cranial nerves) are apparently single. Such is the speech centre, low down on the gray matter in the front of the left cerebral hemi-

sphere. Any brain centre may conceivably be trained by use, enfeebled by disuse or insufficient use, excited by irritants, and paralyzed by a sufficient injury. Thus, one becomes expert in any movement through habit, and loses expertness for want of practice; and this not merely because of muscular incapacity, but because the impulse is not properly generated in the brain and transmitted by a nerve. Also, a nerve centre becomes irritated by a certain degree of pressure, and works independently of volition—as in epilepsy, started by the pressure of blood or broken bone on the brain surface. • A greater degree of pressure from the same cause will produce, not movement, but immobility, followed, if the pressure reach vital centres, by insensibility and death. The sensory centres are not so well mapped out as the motor, for obvious reasons.

Development.—The brain at birth is heavy in proportion to the total body weight. It increases rapidly during the first seven years; more slowly from then until the age of about twenty; then more slowly still, until about forty. Soon after that age the weight begins to lessen very slowly. Sight and hearing are dormant at birth, and all the other senses are probably almost functionless.

Diseases.—Development may stop prematurely, and is followed by premature ossification of the cranial sutures, producing microcephaly. Hydrocephalus (water on the head), if severe, is also a cause of impaired development of the brain, and consequently of the faculties. Brain troubles in children occur chiefly through faults of development, or through the greater instability of the developing tissues. In old age, cerebral troubles arise from the weakness of degeneration, due in some

cases to age alone, and in others to the gradual effect of chronic disease. The commonest of brain affections in old age arise from the loss of elasticity of vessel walls, and perhaps a roughening of their inner surface. Thereafter any increased blood pressure tends to rupture the walls and produce cerebral hæmorrhage; or a thrombus forming in the vessel, and blocking the circulation, may cut off the blood supply from a part of the brain, so that it ceases to work. 'A man is as old as his tissues,' and their age, for working purposes, is governed by the treatment which he has given them: one may suffer from the cerebral effects of old age before one has reached middle life. (See CEREBRAL SOFTENING, and also VESSELS, DISEASES OF.) The commonest symptoms of disease of the unstable, developing brain are convulsions, often slight, and due merely to distant irritation (such as worms), or developing to the extent of true epilepsy. Inflammation of the brain coverings (meningitis) may be simple, or may arise from tubercle. Syphilis, tubercle, and alcohol are probably the commonest causes of cerebral degeneration; but it must not therefore be supposed that all cerebral mischief is either syphilitic, tuberculous, or alcoholic. Physical violence, producing hæmorrhage, or pressure of depressed bone, often starts brain symptoms. Gradually growing tumours, either of the brain substance, or arising from the inner table of the skull, will slowly disturb those parts of the brain on which they press, and first excite and then destroy their powers. The brain is remarkable as an organ both for its extreme delicacy and its great power of resistance and recuperation. A man may live with a bullet in or through his brain, and may die as the result of brain trouble the

originating cause of which cannot be detected by any known method; he may live after an iron bar has passed through the roof of his mouth and out at the crown of his head, yet he may die because of a minute clot of blood. See Ferrier's *The Functions of the Brain* (2nd ed. 1886); Horsley's *Structure and Functions of the Brain* (1892); Cunningham's *Text-book of Anatomy* (1902); Obersteiner's *The Anatomy of the Central Nervous System* (trans. Hill, 1890); Mendel's *Gehirn, Anatomisch* (1886); Gehuchten's *La Structure des Centres Nerveux* (*La Cellule*, vii. 1891); Luy's *The Brain and its Functions* ('International Science Series,' 1884); Quain's *Anatomy*, vol. iii. pt. 1 (10th ed. 1893); *Diseases of the Nervous System*, Turner and Grainger Stewart (1910).

Brain Coral (*Meandrina*), one of the madreporian or reef forming corals, which has the surface of the corallum curiously convoluted, so that in surface view it somewhat resembles the human brain.

Braine - l'Alleud, tn., prov. Brabant, Belgium, 10 m. s. of Brussels; manufactures glass and cottons. Pop. 8,500.

Braine - le - Comte (Flemish, *'s Graven-Brakel*), tn., prov. Hainaut, Belgium, 18 m. s.s.w. of Brussels; has stone quarries and makes lace thread. Pop. 9,000.

Brainerd, tn., Minnesota, U.S.A.; co. seat of Crow Wing co., on the l. bk. of the Mississippi R., 110 m. N.W. of St. Paul. Has foundries, lumber mills, and cigar factories. Pop. 7,590.

Brainerd, DAVID (1718-47). American missionary, born in Connecticut; devoted his life to work among the N. American Indians. His *Journal* (1826) has taken rank as a religious classic. He died in the house of Jonathan Edwards, who afterwards became his biographer (1749; new ed. 1884).

Braintree. (1.) Par. (2,282 ac.) and mkt. tn., Essex, England, on the river Brain, 40 m. N.E. of London; manufactures crape, silk, brushes, iron-work, and cocoanut matting. Brewing is carried on. Pop. 5,500. See Cunnington and Warner's *Braintree* (1906). (2.) Tn., Norfolk co., Massachusetts, U.S.A., 10 m. S.S.E. of Boston. The chief manufactures are electrical machinery, leather, shoes, and carpets. Down to 1792 Braintree included a part of Quincy, the birthplace of the presidents John Adams and John Quincy Adams. Pop. 6,000. See Pattee's *History of Old Braintree and Quincy* (1878), and Wilson's *Quincy, Old Braintree* (1906).

Braithwaite, JOHN (1797-1870), English engineer, was born in London. His earliest works were the air-pumps for the ventilation of the House of Lords (1820); in 1822 he devised the donkey engine. In 1823 he cast the statue of the Duke of Kent which was erected in Portland Place, London. In 1829, in conjunction with Captain John Ericsson, he constructed for the Stephensons the locomotive engine the 'Novelty,' the first that ever ran a mile within a minute. He also manufactured the first practical steam fire-engine; and in 1833, with the assistance of Ericsson, he built the calorific engine. In 1834 he projected and laid out, along with C. B. Vignoles, the Eastern Counties Railway. In 1836-8 he and Ericsson fitted a canal boat with screw propeller, which voyaged from London along the canals to Manchester, returning by way of Oxford and the Thames.

Brake. tn., grand-duchy of Oldenburg, Germany, on the left bank of the Weser, 27 m. N.E. of Oldenburg. It has shipbuilding and ropemaking industries. Pop. 5,200.

Brakes are devices for arresting motion or for absorbing

energy. The former are familiar in their use on ordinary vehicles, railway cars, and street cars. They are also necessary on elevators (lifts), on hoisting-engines and appliances, and on inclined railways or cableways. There is a large variety of different forms for these various uses, and hand, steam, air, hydraulic, or electric power may be utilized for working them, often in conjunction with springs. Of course, all these brakes absorb power, but their direct function is to reduce excessive speed, or bring a moving machine to a stop. Absorption brakes (used in engine testing), however, primarily absorb energy (by converting it into heat), the engine running at uniform speed. The Prony brake, rope brake, and hydraulic brake are used for this purpose. They are also called absorption dynamometers. For brakes of this class see DYNAMOMETER.

A vehicle may be braked by means which tend to prevent the wheels from turning (wheel brakes), or by grips or friction devices which take hold of the track, and thus check the vehicle (track brakes). The former are most common. They comprise: simple or shoe brakes, in which a block (brake-shoe) fastened to the car is pressed against the wheel to resist its turning by producing friction between wheel and shoe; band or strap brakes, in which a loose band surrounding an enlarged hub of the wheel is drawn up tight, producing great frictional holding; disc brakes, in which a disc fast on the axle and a disc held by the car are pressed together to produce friction; cone or cup brakes, like disc brakes, but having instead of discs a cone and cup which are forced into each other; electric eddy-current brakes, in which a disc fast on the axle turns past the faces of an electromagnet so

as to set up eddy-currents in the disc which resist the rotation; and electric generator brakes, which consist of a motor run reversed as generator, so that the induced currents drag back on the armature and resist the rotation.

Sand tracks, used on railways at times to prevent a car going beyond a fixed danger limit, are also brakes. They consist simply of a layer of sand over the track, 1 to 3 in. deep over top of rail, which checks the wheels. This simple device, not much used, needs no further reference.

Of the above forms, *snoc brakes* exclusively are used for railway cars. The prototype (hand operated) is seen on ordinary vehicles. Railway car brakes are operated by hand and by power (steam, vacuum, compressed air). Street railway cars mainly use hand and air operated shoe brakes, but occasionally track brakes are employed, and electric cars may always be braked electrically through the motors.

Band brakes are used on automobiles exclusively, and on hoisting-engines, crane motors, and electric elevator motors.

Disc brakes have been tried for street cars, but have been abandoned. The best example of the disc brake is found in the speed-governor of the phonograph, where a fly-ball governor presses against a friction disc when the correct speed is just exceeded. Some types of geared hoisting blocks use disc brakes to hold the load against running down. Cone brakes are sometimes used in such appliances.

Eddy-current brakes are used chiefly in electric meters, where they regulate the speed to the proper amount for correct registry.

Track brakes are either simple friction shoes or gripping jaws. A track brake frequently employed for electric cars uses fric-

tion shoes in conjunction with shoe wheel-brakes and electric braking. The motors are so connected (by shifting the controller to the braking point) that their rotation generates current at the expense of the car's momentum, which is sent through magnet windings on the track shoes, drawing these down upon the track by magnetic attraction. The drag of these shoes against the rail not only retards the car directly, but also through a set of links presses a set of brake shoes against the wheels. The gripping-jaw type of track brake, on the other hand, is used as safety brake on elevators, on inclined railways, and on cableways. In the first case it grips the guide bars; in the second, the heel of the track-rail; and in the third, the carrying-rope. Usually, these safety brakes are thrown on by strong helical springs released by a trigger, which is worked either by hand or by a speed-governor. (Electric elevator motors similarly are braked by a band brake held in action by strong springs, and released only when current is applied to a set of magnets arranged to pull off the brake against the spring pressure.) In elevators and cable railway inclines, also, there is usually a spring-operated safety brake, which is held off by levers on which the cables pull, so that if the cables should be broken the jaws will grip the rail and bring the car to a stop.

The chief details which we can consider here are the arrangement and operation of band brakes and pneumatic railway brakes.

Band brakes. The best form of band brake consists of a metal or leather band completely encircling a smoothly turned hub or rim on the axle to be braked. The ends of a band are not joined directly, but have one of two

forms of connection: (1) One end may be fastened to a fixed support adjacent to the brake rim, while the other end is hitched to a lever so pivoted that a pull on the handle exerts a multiplied pull on the band. The rotation of the axle should be in the direction from the fixed support toward the lever end of the band, so that the band tends to draw itself tight by the drag of the wheel, the lever having little more to do than take up the slack. (2) Both ends of the band may be fastened to the lever, being attached on the same side of the fulcrum, but at different distances from it. Such a brake, if these distances from the fulcrum are suitably proportioned, will draw itself tight just as soon as the lever is pulled enough to lay the band snug on the brake rim. An enormous braking force may be obtained with very slight pull on the lever; in fact, unless the band when released by the lever holds itself clear of the rim it may draw itself into full action by slight initial contact friction.

Railway brakes. In passenger trains each vehicle has a separate brake, worked from the engine, there being two systems in use—the Westinghouse and the vacuum. The former was invented

by compressed air, supplied by a small compressor on the engine. The air is pumped into a reservoir, from which it is admitted by a valve, under the control of the driver, into the train

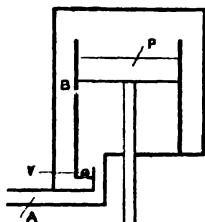


FIG. 2.

pipe. B is the brake cylinder and piston—the piston rod, D, being connected by levers to the brake blocks. V is a 'triple valve,' consisting of a piston, P, and a slide valve, C. R is a reservoir of compressed air. When the piston, P, is in the 'off' position shown in the figure, air from the train pipe, E, passes into the reservoir, R, a small groove allowing it to pass the piston, P; so that when the brake is off, the reservoir, R, is always kept full of air at the same pressure as the train pipe. Any air in the brake cylinder can escape past the valve, C, into the atmosphere at A. When the driver desires to put on the brakes, he allows air to escape from the train pipe, E, causing a fall of pressure in the pipe. The air in the reservoir, R, then tries to pass into the train pipe, and in doing so forces down the piston, P, which carries with it the slide valve, C. Air is then admitted from R into the brake cylinder, B, and the brake is put on. To take off the brakes, the pressure in the train pipe, E, is restored, when the piston, P, and slide valve, C, move back, and the air in the brake cylinder escapes to the atmosphere at A.

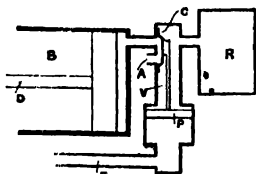
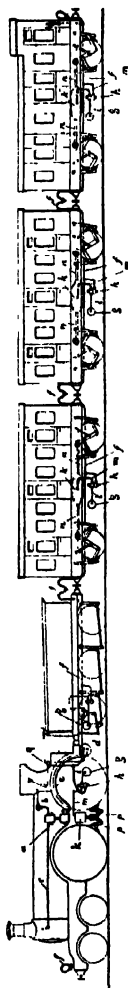
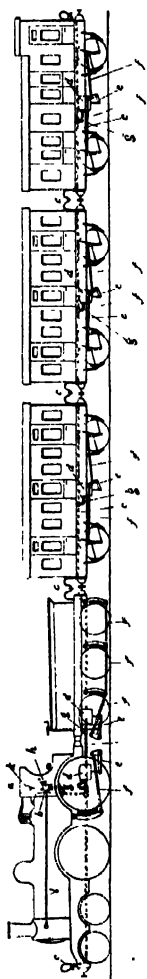


FIG. 1.

by George Westinghouse of Pittsburgh, U.S.A., in 1872; the latter was patented a few years later. Fig. 1 shows in a diagrammatic way the construction of the *Westinghouse brake*, which is worked



BRAKE.—FIG. 3. TRAIN FITTED WITH THE WESTINGHOUSE BRAKE.—*a* is the steam air-pump supplied with steam through pipe *b*, and exhausting into smoke-box through pipe *c*. This air-pump delivers air to the main air chamber *d* through pipe *e*, and thence to the train pipe *f* through the driver's valve *g*. *fff* is the train pipe connected with the small air chambers *ggg* under each vehicle through the triple valve *h*. *h* these valves supplying air to the brake cylinders *kkk* from the air chambers *ggg* through the pipes *i* and *m*. Brake cylinders *kkk* are fitted with pistons, applying the brakes to the wheels of the carriages and tender through the rods *nnn*, and to the wheels of the engine through the rods and levers *ppp*. *q* is the driver's valve through which air is allowed to escape from the train pipe in order to apply the brakes, and supplied to the train pipe *f* from the main air chamber *d* in order to release the brakes. *r* is a pressure gauge, showing pressure in the train pipe *f* and main air chamber *d*.



BRAKE.—FIG. 4. TRAIN FITTED WITH THE VACUUM BRAKE.—*a* is the pipe which supplies steam to the ejector *b*, by means of which the air is withdrawn from the train pipe *c* and delivered into the smoke-box and funnel of the locomotive by the pipe *d*. *dd* are vacuum chambers placed under each vehicle, and fitted with pistons which operate the brakes through the levers *ee* and the coupling rods *fff*. The vacuum chambers *dd* are coupled to the train pipe *c* through the pipes *ggg*. *h* is a driver's valve which admits steam to the ejector to withdraw the air from the train pipe and vacuum chambers in order to release the brakes, and which also admits air to the train pipe and vacuum chambers to apply them. *k* is a vacuum gauge.

The *vacuum brake*, as its name implies, works by utilizing the pressure of the atmosphere by first creating a partial vacuum. Fig. 2 shows diagrammatically the construction of the brake. It consists of a cylinder with a piston, *P*, which is connected to the brake blocks, and a ball valve, *V*. The lower side of the piston is always in communication with the train pipe, *A*, in which a partial vacuum is always maintained when the brakes are off, by means of an ejector on the engine. Also, any air above the piston, *P*, will pass down the passage, *B*, and through the valve, *V*, into the train pipe, *A*, from which it is exhausted by the ejector on the engine; so that when the brakes are off there will be a partial vacuum on each side of the piston, *P*, which will be in its lowest position. To apply the brakes, the driver admits air to the train pipe, *A*; the air rushes into the cylinder, and lifts the piston, *P*, being prevented by the valve, *V*, from passing to the upper side of *P*.

In both the vacuum and the Westinghouse brake, should a coupling break, and a portion of the train become detached from the remainder, the breaking of the train pipe will immediately cause the brakes to be put hard on. The most recent improvements in these brakes have been connected with the provision of very rapidly acting valves, which enable the application of the brakes to be made almost simultaneously on every pair of braked wheels of the train. Figs. 3 and 4 give details of trains fitted with the Westinghouse and the vacuum brake respectively. For brakes in cycles, motors, guns, etc., see these articles.

Brake. See **BRACKEN**.

Brake Horse Power. See **HORSE POWER**.

Brakelonde. See **JOCELIN DE BRAKELONDE**.

Bramah, JOSEPH (1748-1814), English mechanical inventor, was born at Stainborough in Yorkshire; worked for some time in London as a cabinetmaker. In 1796 he invented the hydraulic press that bears his name, by means of which a number of small impulses may be converted into a continuous pressure of practically unlimited amount. His patent lock (1784) was believed unpickable, until actually picked in 1851 by an American called Hobbs. In 1806 he patented a machine for printing bank notes which was adopted by the Bank of England. He also devised improvements in pumps, wheel carriages, engine boilers, fire-engines, and paper-making. See Smiles's *Industrial Biography* (new ed. 1879).

Bramante, DONATO D'AGNOLO (1444-1514), Italian architect of the renaissance; born near Urbino. He at first studied painting, but upon reaching Milan (1472) he devoted himself to architecture. He next settled (1499) in Rome, and became a favourite with Pope Julius II. His chief works are the joining of the Belvedere Palace with the Vatican by means of two grand galleries (*loggie*), and the rebuilding of St. Peter's at Rome, begun in 1506, and finished, with alterations by Michael Angelo and others, after his death. In the Raphael Palace and the chancery and church of San Lorenzo, in Rome, he showed a predilection for Grecian architecture, in which he instructed his nephew Raphael, whose genius he was the first to bring to light. Bramante stands at the head of the renaissance architects of Italy. Breadth, mass, and classic grace are the chief characteristics of his style. The surname Lazzari, which was formerly given to him, is now believed to be an error. See Semper's *Donato Bramante* (1879).

Bramantino, whose proper name was BARTOLOMMEO SUARDI (†1470-c. 1535), Italian painter of the Lombard school, born at Milan. He was the pupil of Foppa and Leonardo da Vinci, then of the architect Bramante, hence his cognomen ('Little Bramante'). He occupied an important position in Milanese art after the departure of Leonardo in 1499, and influenced Luini and Gaudenzio Ferrari. In the meantime, however, he seems to have accompanied Bramante to Rome; for in 1506 he collaborated with Sodoma in Rome upon frescoes in the Vatican, afterwards destroyed and replaced by those of Raphael. His chief works are to be found in Milan. His fine *Adoration of the Magi* in the Layard Collection, Venice, will ultimately be placed in the National Gallery, London. There are six panels of heads by him in the S. Kensington Museum, and two frescoes in the Wallace Collection. See Selwyn Brinton's *Renaissance in Italian Art* (2nd ed. 1903).

Brambanan, or PARAMBANAN, a vil. of Java, 10 m. by rail E. of Jokjokarta, with ruins of six groups of ancient temples, in all probability Buddhist. They resemble in plan and arrangement the famous temple of Boro-Budur. Local tradition puts their creation back to the second half of the 13th century.

Bramble, or BLACKBERRY (*Rubus fruticosus*), belongs to the same genus as the raspberry and the dewberry, and is a member of the order Rosaceæ. It is a shrub which is assisted in climbing through hedges and thickets by its numerous prickles. The leaves vary in colour, according to the season, from green to brilliant yellow and crimson, with pinky-white flowers, which appear late in the summer; and the fruit consists of small dark-purple or black stone berries, resembling a

raspberry, and not ripening till late autumn. Hooker and Arnott enumerate seven varieties of the British bramble. The foreign varieties are more numerous. The blackberry is extensively cultivated for the sake of its fruit in America, the berries being thus improved in quality and quantity; but in Britain the cultivation extends only to the production of flowers—the best-known varieties being the *Rubus deliciosus*, from the Rocky Mountains, the finest ornamental bramble grown; the Japanese bramble, a rapid-growing climber; and the Himalayan bramble, with silvery-white stems show up well in winter.

Brambling, or BRAMBLE FINCH (*Fringilla montifringilla*), a beautiful little bird allied to the chaffinch, which nests in N. Europe and Asia, and migrates northwards in autumn. It nests regularly in the northern parts of Great Britain.

Bramhall, JOHN (1594-1663), Irish prelate; a scion of the Bramhalls of Branhall Hall, Cheshire; passed over to Ireland in 1633 as Wentworth's chaplain, was consecrated bishop of Derry (1634), and became one of Wentworth's chief agents in his proceedings against the recusants and the covenanting Ulster Scots. On Strafford's impeachment Bramhall was also imprisoned and impeached by the Irish Commons, but was liberated by the king. On the collapse of the royalist cause in England he took refuge in Paris, where he associated with Hobbes. But at the restoration he became archbishop of Armagh, and rigorously carried out his policy of compelling conformity. His works are published in the Anglo-Catholic Library (1842). See Vesey's *Life* in ed. of *Works* (1677); J. S. Reid's *History of Presbyterian Church in Ireland* (new ed. 1867).

Brampton. (1.) Tn., 9 m. N.E. of Carlisle, England. It is a market town, and has manufactures of cotton and tweeds. The fine border castle of Newark is in the neighbourhood. Pop. 2,500. (2.) Co. tn., Peel, Ontario, Canada, 20 m. W. of Toronto; important grain and flour market. Pop. 2,500.

Brampton, BARON. See HAWKINS, SIR HENRY.

Bramwell, SIR FREDERICK JOSEPH (1818-1903), engineer, was born in London. After some experience as manager of an engineering factory, he started business as a civil engineer, and obtained an extensive practice. He was president of the Institute of Civil Engineers (1884-5), chairman of the executive committee of the Inventions Exhibition (1884), and president of the British Association (1888). In 1874-5 he acted as president of the Institute of Mechanical Engineers.

Bramwell, GEORGE WILLIAM WILSHIRE (1808-92), Baron Bramwell, English judge, was born in London, and became a barrister in 1838. He acquired a lucrative practice, and was made Q.C. in 1851. In 1856 he succeeded Baron Parke as Chief Justice of the Court of Exchequer, and was knighted. In this capacity he continued to exist in the law until it ceased to exist in 1880, when he was appointed one of the Justices in the court of appeal established by the Judicature Acts. He retired from that office in 1881, and in 1882 he was created a peer by the title of Baron Bramwell. Two of Bramwell's best-known contentions as a judge were that by English law some insane persons who commit crimes are responsible for their actions and others are not; and that a corporation was legally incapable of malice, and therefore could not be sued as such for malicious prosecution. See C. Fairfield's *Life* (1898).

Bramwell, JOHN MILNE (1852), Scottish physician, was born at Perth, and studied in Edinburgh. He practised for some years at Goole in Yorkshire, and after 1889 attracted considerable attention by his publications on hypnotism and his treatment by suggestion. He settled in London in 1892. His works include *James Braid, Surgeon and Hypnotist*; *Hypnotic Anaesthesia*; *Suggestion, its Place in Medicine and Scientific Research*; *Dipsomania and its Treatment by Suggestion*; *Hypnotism; its History, Practice, and Theory* (1903); and *Hypnotism and Treatment by Suggestion* (1909).

Bran, the husk or outer covering of wheat, which, in the process of milling, is separated from the finer flour. In 100 parts of bran, which has the appearance of scaly yellow-brown particles, we find of water, 13.1; albumin, 19.3; oil, 4.7; husk, 55.6; ash or saline matter, 7.3. Bran is used in the making of digestible brown bread; for feeding horses, cattle, and poultry; and by calico printers for removing the colouring matter from the parts of their goods which are not mordanted.

Bran, a name in Celtic legend variously associated with the hero of the Welsh *Mabinogion* of *Branwen*, the hero of the 8th-century Irish epic, *The Voyage of Bran*, and the dog of Ossian's Fingal. See Meyer and Nutt's *Voyage of Bran* (1895).

Branchia. See GILLS.

Branchida, an ancient town near Miletus, on the coast of Asia Minor, famous for its temple and oracle of Apollo Didymæus.

Branching. When any part of a plant gives rise to second parts similar to itself, it is said to branch. Thus, a stem forms stem branches, and a root forms root branches. These branches may arise either from the sides of the parent structure (*monopodial branching*), or from division of

its growing apex (*dichotomous branching*). In the former case the branch or branches may remain subordinate in size and position to the parent axis (*racemose branching*), or may displace and overtop it (*cymose branching*). In many of our forest trees—*e.g.* lime, elm, birch, etc.—the buds which are formed throughout the growth of any one year grow out, during the following spring, into lateral branches, the branching being thus typically racemose. The last formed bud, however, grows very rapidly, and pushes to one side the prolongation of the main axis, taking its place, and becoming the main axis of the following year, so that the sequence of racemose branching is annually interrupted by the occurrence of a single cymose branching at the end of each year's growth. In the common lilac a very similar mode of annual cymose branching may be observed; but in this case the branches are arranged in pairs, and the last pair of buds formed in each year grow equally, forming two main axes of the second year, while the prolongation of the preceding main axis dies. When two new main axes arise, as in the lilac, the cyme is said to be *biparous*; when only one, as in the lime, etc., it is said to be *uniparous*.

Branchiopoda, a term used in the classification of the lower Crustacea (Entomostraca). It has been used both as an ordinal and as a subordinal term, and in the former case includes both Cladocera and Phyllopoda. In the narrower sense it includes only such forms as Apus, the brine-shrimps, and similar organisms.

Branco, CAPE, headland, Parahyba state, Brazil, 60 m. N. of Pernambuco, the most easterly point of the South American continent.

Branco, RIO ('white river'), riv., Brazil, rises in Parima Mts.,

between Venezuela and Brazil, and after a course of 400 miles joins the Rio Negro, a trib. of the Amazon.

Brancovan, CONSTANTIN (1654-1714), prince of Walachia from 1688; rendered great service to the Porte in the campaign against Austria in 1690, and helped Tököly to become prince of Transylvania. In the contest between the Porte and Peter the Great of Russia his attitude was doubtful, but in the disastrous campaign of Peter the Great on the Pruth, when he was forced to make peace (1712), Brancovan again took the part of the Porte; whereas Dimitrie Cantemir, the prince of Moldavia, rendered all possible assistance to Russia. Notwithstanding this, Brancovan was accused of treason, deposed, carried prisoner to Constantinople, and put to death, together with his four sons (1714), and his vast fortune was confiscated. This marked the beginning of the Phanariot period (1714-1821) of the principalities. See ROUMANIA.

Brand, HENRY BOUVIERE WM. (1814-92), first Viscount Hampden, and twenty-third Baron Dacre, Speaker of the House of Commons, entered Parliament in 1852 as Liberal member for Lewes, which he represented till 1868, when he became M.P. for Cambridge county. In 1859 he was appointed financial secretary to the Treasury, and acted as Liberal whip till 1863. In 1872 he was elected Speaker of the House of Commons, holding this office till 1884, when he was created a peer, with the title of Viscount Hampden.

Brand, SIR JAN HENDRIK (1823-88), president of the Orange Free State, son of Sir H. C. Brand, Speaker of the Cape House of Assembly, was born at Cape Town. He practised as a barrister till 1863, when he was elected president of the Boer state, a position

which he held for four successive terms of five years each. At the beginning of the struggle between Great Britain and the Transvaal in 1880, Brand maintained the strict neutrality of his republic, and was present as mediator in 1881 at the conference which led to the final arrangement of peace after the British defeat at Majuba Hill. Brand's phrase, 'Als sal recht komen' (All will come right), has often been quoted in South African discussions.

Brand, JOHN (1744-1806), English antiquary, became rector of the united parishes of Mary-at-Hill and St. Mary Hubbard, London, in 1784, and was also secretary to the Society of Antiquaries from that year till his death. Chief works: *Popular Antiquities* (1777; enlarged 1813; new ed. 1888), which stands in the first rank of books of its kind; *History and Antiquities of Newcastle-on-Tyne* (1789); and *Letters to Mr. Ralph Beilby* (1825).

Brande, WILLIAM THOMAS (1788-1866), English chemist, was born in London. He became member of the Westminster Medical Society (1805), fellow of the Royal Society (1869), professor of chemistry to the Apothecaries' Company (1812), succeeded Davy in the same capacity at the Royal Institution (1813), and in 1854 became chief officer of the coinage department at the Mint. Besides papers in the *Transactions of the Royal Society*, Brande was author of *a Manual of Chemistry* (1819; 6th ed. 1848), *Elements of Chemistry* (1831), and *a Dict. of Pharmacy and Materia Medica* (1839), and edited the *Dict. of Science, Literature, and Art* (1842; new ed. by Cox, 1875).

Brandenburg. (1.) Province of Prussia (15,383 sq. m.), occupying the middle of the N. German plain—i.e. the Havel Spree depression, the valleys of the mid-

dle Oder and its trib. the Warthe, and part of the valley of the middle Elbe. Forty-six per cent. of the area is under cultivation, the most fertile land lying in the N. and middle. Fruit, flax, hemp, and vines are cultivated. In the S. forests cover thirty-two per cent. of the area. Lignite is mined to the annual value of three-quarters of a million sterling; other mineral products are iron, lime, and gypsum. Berlin is the capital of the province. Other important towns are Frankfurt-on-the-Oder, Potsdam, Charlottenburg, and Spandau. The history begins with its colonization by Wends and other Slavs in the 6th century. Their first subjugation was effected by Albert the Bear, who assumed the title of Margrave of Brandenburg in 1134. In 1356 it was made an electorate of the empire. In 1415 the emperor conferred the electoral dignity of Brandenburg upon Frederick, burgrave of Nuremberg, of the house of Hohenzollern, the present imperial dynasty of Germany. With the accession of Frederick William, the Great Elector, the history of Brandenburg merges in that of Prussia. Pop. 3,550,000. (2.) Town, prov. Brandenburg, Prussia, 38 m. w.s.w. of Berlin, and on the Havel; produces baskets, bricks, leather, flour, and silks. From 949 to 1544 it was the seat of a bishop. Pop. 55,000.

Brandes, GEORG MORRIS COHEN (1842), Danish critic, of Jewish extraction, whose *Æsthetiske Studier* (1868) and *Kritiker og Portraiter* (1870) caused him to be regarded as one of the most promising of the younger critics. The teaching of John Stuart Mill, Taine, Renan, and Comte gave his criticism its philosophical basis. In 1871 he began his lectures *Hovedstrømningene i det 19. Aarhundredes Literatur* (6 vols. 1871-90; Eng. trans. 1886-

1906). He pursued his theories in various publications, besides translating John Stuart Mill's *Emancipation of Woman* into Danish. Brandes breathed a new spirit into Danish literature, and gathered around him many talented men in the journal *Det Nittende Aarhundrede*. From 1877-83 he resided at Berlin, where he wrote, among other things, *Danske Digtere* (1877), *Søren Kierkegaard* (1877), *Essais Tegnér* (1878), *Benjamin Disraeli* (1878; Eng. version 1879), *Ferdinand Lassalle* (1877), *Ibsen* (1898). His influence in Scandinavia and on the Continent has been incalculable, though there are signs that it is now on the wane. His partialities and strong antipathies often obscure his judgment; his anti-clericalism approaches fanaticism; and his attitude towards the Christian religion generally is that of a pagan philosopher. After his return from Berlin his principal works were *Mennesker og Værker i nyere Europeisk Literatur* (1883); *Essays*, two series (1889, 1897); *Holberg* (1884); *Poland* (1888); *Indtryk fra Rusland* (1889; Eng. trans. 1889 and 1890); *Det Moderne Gjennembruds Mænd* (1883); *William Shakespeare* (1895 and 1898; trans. W. Archer, 1898); and the autobiographical *Levned* (1906, etc.). His *Samlede Skrifter* appeared in 1900-8.

Brandes, CARL EDVARD COHEN (1847), Danish author, brother of Georg Brandes, distinguished himself early as an Orientalist and original dramatist, as a member of the Folkething, as one of the best debaters of the Left since 1880, and as assistant editor of the influential *Morgenblad*, and subsequently of *Politiken*. Like his brother, a strenuous radical, with a somewhat pessimistic point of view, his brilliant talents are counterpoised by an irritating dogmatism. He

has written several plays—e.g. *Lügemidler* (1881), *Et Besøg* (1882), *Under Loven* (1890), *Asgerd* (1895), *Vera* (1904), and *Haardt imod Haardt* (1904). A romance by him, *Jung Blut* (1899), led, because of its unveiled naturalism, first to a bitter controversy, and finally to a prosecution and fine.

Brandfort, tn., Orange Free State prov., S. Africa, 35 m. N.E. of Bloemfontein; alt. 4,566 ft. Pop. 2,000 (whites, 400).

Branding (cognate with Ger. *brennend*, 'burning') primarily denotes the impressing of a mark with hot iron upon men, beasts, or inanimate objects. From early times it was customary to brand felons and slaves with certain marks, which, being indelible, distinguished them for life from their fellow-men. Hence the secondary application of 'brand' and 'stigmatize' (from Gr. *stigma*). Offenders against English law were branded on the breast, on the cheek and forehead, on the shoulder and hand, and on the cheek alone, according to circumstances, usually with a certain letter denoting the offence. In 1424 an Act of the Scottish Parliament ordained that vagrants be burnt on the cheek, and a later Act of 1574 specified that they should be 'burnt through the gristle of the right ear with a hot iron of the compass of an inch about.' Branding was the custom in France, where, until 1832, a letter or letters were branded on the shoulder of a galley slave; previously, the *fleur-de-lis* was the mark impressed. Burning with a hot iron had, however, been completely abandoned in Britain (1829) and France before the middle of the 19th century; but in the United States slaves were burnt in the hand with their master's initial until the outbreak of the civil war. The Jamaica planters also used to mark their initials on the bodies of their slaves with a silver

brand dipped in burning spirits. Modern branding is confined to stamping a distinguishing mark upon goods or the cases which contain them. (See TRADE MARKS.) On the option of a curer, herrings are branded by government inspectors. Horses and cattle on large ranches are branded with their owner's mark. In the pastoral colonies, such as Australia and South Africa, the branding question is one of vital importance, and has been dealt with in numerous Brands Acts.

Brandis, CHRISTIAN AUGUST (1790-1867), German philologist and philosopher, was born in Hildesheim, and was professor of philology at Bonn from 1822 till his death. He visited the principal libraries in Europe to prepare, with Bekker, the edition of the works of Aristotle (1831-36) undertaken by the Berlin Royal Academy of Science. His principal work was *Handbuch der Geschichte der Griechisch-römischen Philosophie* (1835-66). See Trendelenburg's *Zur Erinnerung* and C. A. Brandis (1868).

Brandl, ALOIS LEONHARD (1855), Austrian student of English literature, born at Innsbruck, and became professor of philology successively at Prague (1884), Göttingen (1888), Strassburg (1892), and Berlin (1895). He has written *Coleridge und die Englische Romantik* (1886; Eng. trans. 1887), *Geschichte der mittellenglischen Literatur* (1892), *Die Quellen des weltlichen Dramas in England vor Shakespeare* (1898), and *Ag. Literature* (1908), and edited a new issue of Schlegel and Tieck's German translation of Shakespeare (10 vols. 1897, etc.), as well as an edition of *Thomas of Ercelesbourne* (1881).

Brandling (*Lumbricus fætoidus*), an earthworm remarkable for its banded body. It is a small species, and much prized by anglers as bait.

IV.

Brandon. (1.) Parish (6,759 ac.) and mrkt. tn., partly in Suffolk and partly in Norfolk, England, on the Little Ouse (which here separates the two counties), 7 m. N.W. of Thetford. The free grammar school dates from 1646. Considerable trade is done in grain, timber, coal, and rabbit skins. In 1870 implements of Neolithic times were discovered here. Pop. 5,800. (2.) Tn., Manitoba, Canada, co. seat of Brandon co., on the s. bank of the Assiniboine R., 126 m. W. of Winnipeg, on the C.P. and C.N. Rys. It has a government experimental farm, and exports large quantities of wheat and lumber. Pop. 11,000.

Brandon, CHARLES, DUKE OF SUFFOLK. See SUFFOLK.

Brandon, RICHARD (d. 1649), succeeded his father as public executioner (1640), and is said to have beheaded Charles I., Stratford, Laud, and others.

Brandon, ST. See BRENDAN, ST.

Brandram, ROSINA (1846-1907), English actress, born in London. She made her début in 1877 at the Opéra Comique, London, in *The Sorcerer*. After a tour in the United States she returned to London, and appeared at the Savoy in *Iolanthe* in 1882; this was followed by *Princess Ida*, *The Mikado*, *Ruddigore*, *The Yeomen of the Guard*, *The Gondoliers*, *The Vicar of Bray*, *Haddon Hall*, *Utopia Limited*, *Mirette*, etc.

Brandt, ENEVOLD, COUNT (1738-72), Danish statesman, was through the influence of his friend Struensee appointed (1770) chief warden to the imbecile Christian VII. His jealousy of Struensee led him to plot against that minister; but before he could take any action he was involved in the ruin of his former friend, and was beheaded.

Brandy (Ger. *Branntwein*, 'burnt wine'; Fr. *cognac de vie*), a spirit prepared by the distilla-

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tion of wines, the quality depending not only on the process, but also on the wine. The best comes from the town of Cognac, in Western France, where a special grape is grown; thus cognac has become a synonym for brandy. Much good brandy is imported from California. The spirit owes its flavour and aroma to the presence of small quantities of furfural, amanthic, acetic, butyric, and other ethers. It contains from forty-seven to eighty per cent. of alcohol, the average being about fifty-four per cent.; the sp. gr. varies from 0·9274 to 0·9342. Like other liquors, brandy is often concocted of alcohol flavoured with the above ethers and diluted with water. The spirit is colourless; pale brandy gains its colour from the cask, and brown brandy from the addition of caramel. In its general medicinal effects brandy may be regarded as alcohol.

spirit obtained by a patent still is not a true brandy; while a genuine brandy may be defined as one distilled from grape wines by a pot still. The best comes from the Charentes; but California, Australia, Spain, Algiers, Greece, Egypt, and Canada all export brandy. The Martell Star brandies are examples of genuine cognacs, rich in esters. Unfortunately, most of the French brandies are patent still products; hence many of them outside the Charentes are blended with cognac to improve their quality. In deciding between brandies an analyst should determine the ethers (esters), furfuroid bases, acidity, aldehydes, and higher alcohols. The minimum for esters should be about 80 parts per 100,000 pure alcohol, and for furfural about 0·75 part. This standard does not apply to vintage brandies, where the esters are often much lower. Examples:—

QUANTITY IN PARTS PER 100,000 OF PURE ALCOHOL.

Constituents.	Genuine brandy from inferior wine.	Genuine cognac.	Sophisticated brandy.
Acidity.....	35·38	94·76	51·8
Aldehydes.....	24·55	10·68	12·7
Alcohols (higher)....	173·60	287·34	422·9
Ethers (esters).....	94·71	116·82	40·8
Furfuroid bases.....	1·39	4·88	2·9
Total.....	333·63	515·08	531·1

Recently many prosecutions have taken place in connection with the sale of brandy. No recognized standard exists, therefore penalties were inflicted only in few cases. It has been shown to be a difficult matter to discriminate between the genuine article and a sophisticated or 'silent spirit' brandy. Generally it is agreed that a neutral

Brandywine Creek flows S.E. through Chester co., Pennsylvania, U.S.A., and joins Christiana Creek near Wilmington, Delaware. On its banks General Howe defeated Washington in 1777.

Brangwyn, FRANK (1867), English decorative painter, born at Bruges in Belgium; worked for William Morris with designs for

tapestries, etc., but left him when only sixteen and went to sea. His paintings include *Ashore* (1890), *Burial at Sea* (1891), *Salvage* (1891), *Convict Ship* (1892). Renan wrote of his pictures, 'The eye rejoices before them; they swim in colour.' His *Trade on the Beach* (1895) is in the Luxembourg, Paris; *The Scoffers* in the Sydney National Gallery; *St. Simon Stylites* in Venice; and his panel *Commerce* in the Royal Exchange, London. See *The Studio* (1898), and Shaw Sparrow's *Frank Brangwyn* (1910).

Brank (in England), or **BRANKS** (in Scotland), a kind of bridle made of iron bands, formerly used to punish scolding women and those guilty of slander. It was occasionally used as a punishment for fornication, and, still more rarely, for men guilty of abusive language. The three specimens in the Antiquarian Museum at Edinburgh are all different in design, and a still greater variety may be seen at pp. 38-64 of *Old-Time Punishments*, by W. Andrews (1890). The witches' branks, preserved in the county hall at Forfar, Scotland, is a spiked collar of cruel design. Nearly all dated specimens in British museums belong to the 16th and 17th centuries. The use of the branks in Great Britain died out about the middle of the 19th century.

Brankovich, **GEORGE**, prince of Serbia from 1425, with intervals, to 1455, served in the Turkish army under Bayazid II., and was made prisoner by Tamerlane. Two years after he became prince of Serbia, Sultan Murad II. invaded that country, and Brankovich was forced to give up a part of it, to recognize the Turkish suzerainty over the part left to him, and to give his daughter to the Sultan in marriage. After being expelled from Serbia, he took part with John Hunyady in his expedition against the Turks, and regained

the independence of Serbia in 1444. After that, however, he was in continual conflict with Hunyady, who often invaded Serbia.

Branksome, par., Dorsetshire, England, 1 m. w. of Bournemouth. Pop. 8,000.

Brant, **JOSEPH** (1742-1807), whose native name was THAYENDANEGEA, was a Mohawk chief and missionary, who fought as a colonel in the British army during the American revolution. In 1787 he settled on a grant of land on the Grand R., Ontario. He built the first Episcopal church in Upper Canada with money collected in England (1786), and translated the Prayer Book and parts of the New Testament into his own tongue. See *Life* by Stone (1865).

Brant, or **BRANDT**, **SEBASTIAN** (1457-1521), German poet and humanist, went to Basel in 1476; licentiate of canon law (1481), and doctor of law (1489). The celebrated preacher, Geiler von Kaisersberg, was instrumental in securing Brant's return to Strassburg, his native city, in the capacity of syndic (1501). In 1503 he was appointed town clerk. He remained at Strassburg until his death. He wrote many works in Latin (mainly religious and political) and German, in prose and verse, popular and learned. His most successful writing was his *Narrenschiff* (1494), a ship sailing to Narragonia (Fools' Land), and having on board over a hundred fools: each of them has some particular folly, which is described by a set of verses, accompanied by a rough woodcut (based on the author's own drawings). Translated into Latin by Locher in 1496, it immediately became popular. In the same year appeared renderings in Low German and in French; in 1500 one in Dutch. The English rendering of 1507 goes back to the French; but Barclay's *Ship of Fools* (1509) is mainly a free translation from

Locher's Latin. It was he who invented the figure of St. Grobianus, the embodiment of the coarseness and indecency of his age. The *Nurrschiff* was edited by Zarneke (1854) and Goedeke (1872); an edition, with all the designs of the original, was issued by Robertag in 1891.

Brantford, *tu.*, Ontario, Canada, 23 m. W. by S. of Hamilton, on Grand R., which is navigable to the town, with short canal connection. It produces large quantities of agricultural and other machinery. It derives its name from the Indian chief, Joseph Brant. Pop. 22,000.

Brantôme, *PIERRE DE BOURDELLES*, *SEIGNEUR DE* (1540-1614), French chronicler, descended from a noble family in Périgord. He became abbé de Brantôme when only sixteen, but the greater part of his life was passed as a soldier and courtier. He accompanied Mary Queen of Scots to Holyrood in 1561. He afterwards fought against the Huguenots in the first (1562) and third (1573) religious wars, and against the Turks (1564 and 1566). He was chamberlain to Charles IX. and Henry III.; but after the death of his patroness, Catherine de' Medici, he retired to Brantôme. There he wrote his famous *Mémoires*, which contain accounts of the principal personages of the period, and are valuable for their faithful portrayal of the scandalous manners of the times. The first edition was published after his death (10 vols. 1666-7); other editions by Le Duchal (15 vols. 1740), Lacour and Merinée (13 vols. 1858-93), Lalanne (10 vols. 1865-81). See *Brantôme, sa Vie et ses Ecrits*, by Lalanne (1897).

Bras d'Or, LAKE, is not a lake but a gulf, Cape Breton I., Canada, 50 m. long by 20 m. broad. The south end is connected by a ship canal (half a mile long) with

St. Peter's Bay, and thus bisects the island of Cape Breton.

Brasenia, a small genus of tropical S. American water-plants, belonging to the Nymphæaceæ, with small dark purple flowers and very mucilaginous peltate leaves.

Brash. See PYROSIS.

Brasidas, son of Tellis, was the most famous and successful Spartan commander in the earlier part of the Peloponnesian war. In its first year (431 B.C.) he saved Methone from an Athenian invading force, became ephor, and distinguished himself at Pylos in 425 B.C. The next year he defeated the Athenians outside Megara, and secured that city to Sparta. He was then on his way to Chalcidice, in Thrace, to stir up disaffection among the Athenian subjects. Arriving there, he succeeded, by his policy of moderation and his energy, in securing Acanthus, Stagirus, Amphipolis, Scione, and Mende. He also accompanied Perdicas, king of Macedonia, on an expedition against the Lyncestians, proving his military ability by a skilful retreat under difficulties. In 422 B.C. he gained a complete victory over an Athenian force under Cleon which was attempting to recover Amphipolis, but fell in the battle, and was buried in Amphipolis. As a soldier and statesman he had abilities unusual in a Spartan—daring, energy, and readiness, moderation, tact, and eloquence. Thucydides relates (bks. ii.-v. incl.) his career.

Brass, an alloy of copper and zinc in various proportions. The alloy was known to the Romans, though bronze, the alloy of copper and tin, was the material most used by the ancients, and is often rendered 'brass.' Brass is prepared by fusing the metals in the proportions of about three of copper to from two to one of zinc in plumbago or clay crucibles. First

a little scrap brass is melted in the crucible with some flux or powdered charcoal; the copper is then added, and, when it is melted, the zinc. After it has stood in the furnace for some time, the alloy is cast into ingots or moulds. Sheet brass is prepared by casting into strips, and these are passed cold through rolls. The proportion of the two metals varies greatly according to the uses to which the alloy is to be put. A large proportion of zinc increases the hardness and lightens the colour, but reduces the tenacity and ductility of the alloy. Brass is highly tenacious, malleable, and ductile, and makes good castings. The addition of two to four per cent. iron gives a very hard and tenacious metal. Brasses, in machinery, are the brass fittings in a bearing in which the revolving journal lies. This comparatively soft metal is introduced so that the shaft may not wear away.

Brass, tn., on R. Brass, S. Nigeria, immediately E. of the mouth of the Niger. The river forms an arm of the Niger delta.

Brasses. See MONUMENTAL BRASSES.

Brasseur de Bourbourg. CHARLES ETIENNE (1814-74), a French abbé, was born in Bourbourg. Proceeding to America in 1846, he was vicar-general at Boston, then a missionary (1848-64) in Central America and Mexico. He was the author of *Histoire de Canada* (1851), *Histoire.... du Mexique et de l'Amérique Centrale dans les Siècles antérieurs à Christophe Colomb* (1857-9), and other works.

Brassey, THOMAS (1805-70), English engineer and railway contractor, was the son of a Cheshire farmer. In 1831-5 he executed contracts on the Grand Junction and London and Southampton Railways. In 1836 he moved to London, and began business in a

large way as a railway contractor. In 1847 and following years he constructed the Great Northern Railway. Other contracts included railways in France, Italy, Spain, Canada, Australia, and India, the Crimean Railway, the Victoria Docks, London, and the East London Railway. His last contract was the Wolverhampton and Walsall Railway. Brassey is said to have left a fortune of about £7,000,000. See *Helps's Life and Labours of Mr. Brassey* (1872).

Brassey, THOMAS, BARON (1836), son of the preceding, was born at Stafford, England. He was elected for Devonport in the Liberal interest in 1865, was called to the bar in 1866, and was elected M.P. for Hastings in 1868, which he represented until 1886. He became a civil lord of the Admiralty in 1880-3, and secretary to the Admiralty in 1883-5. He is a high authority on naval questions, and has been a frequent writer on these subjects. He was chairman of the Opium Commission and the commissions on unseaworthy ships, coaling stations, and pensions to the aged poor. In 1876-7 he and Lady Brassey undertook a voyage round the world in their yacht the *Sunbeam*, and the account which the latter published of the voyage attained wide popularity. Lady Brassey died (1887) on a homeward voyage from Australia. Lord Brassey is the author of a number of works, including *Work and Wages* (1872), *British Seamen* (1877), *The Eastern Question* (1878), *Foreign Work and English Wages* (2nd ed. 1879), *The British Navy*, in 5 vols. (1882-3); *Sixty Years of Progress* (1904); and he edited for a number of years the *Naval Annual*. He was made a K.C.B. in 1880, a baron in 1886, and in 1906 received a G.C.B. He was president of the Institute of Naval Architects in 1893-5, and was appointed governor of Vic-

toria in 1895, but retired early in 1900.

Brassica, a large genus of plants belonging to the Cruciferae, and extending over the whole of Europe and N. and Central Asia. The commonest British species is *B. sinapistrum*, the wild mustard or charlock, a yellow-flowered weed sometimes too abundant in cornfields, its presence pointing to land of poor quality or land that is badly farmed. Many important edible plants belong to the genus. The white and black mustards of commerce are obtained from the seeds of the indigenous *B. alba* and *B. nigra* respectively; while *B. campestris*, also an indigenous plant, has given rise, under cultivation, to the common turnip, which, along with its ally the swede (*B. rutabaga*), owes its importance to a fleshy thickening of the root and lower portion of the stem. Other varieties of *B. campestris* are the rape and colza, from the seeds of which oils are obtained; while the crushed seeds from which the oil has been expressed constitute the cattle food known as oilcake. *B. oleracea* occurs on the cliffs of the English Channel, and is the source from which the various forms of cabbage, kale, kohlrabi, cauliflower, broccoli, etc., have arisen.

Brasso, Transylvania. See KRONSTADT.

Brathwaite, RICHARD (1588-1673), English poet, born in Westmorland. Going to London, he started at once as a poet and dramatist, and continued to produce in a most prolific manner almost every kind of composition. His best-known work, *Barnabe Raiment*, or *Barnabee's Journal* (1638), also known as *Drunken Barnaby's Four Journeys*, was published under the pseudonym of Corymbæus, and is a popular record of English travel in mixed English and Latin verse. His

other works include pastorals like *The Poet's Willow* (1614), satires like *A Strappado for the Devil* (1615), threnodies like *Astraea's Tears* (1641), and novels like *The Arcadian Princess* (1635). See Preface to 9th ed. of *Barnabee's Journal*, by Jos. Haslewood (1820).

Bratianu, ION CONSTANTIN (1822-91), Roumanian statesman; born at Pitești, and educated at Paris, where he took an active part in the revolution of 1848. Returning to Bucharest, he made himself one of the leaders of the Roumanian revolution of the same year, and was elected a member of the provisional government. Then he took a prominent part in calling to the Roumanian throne Prince Charles of Hohenzollern. From that time (1866) he was the leading statesman in the country, being prime minister from 1876 to 1888, a period during which Roumania took part in the Russo-Turkish war of 1877-8, became independent of Turkey, and was raised to the status of a kingdom (1881). In 1878 Bratianu represented his country at the Congress of Berlin. During the period of his rule, also, a great number of administrative reforms were introduced in Roumania, the railways nationalized and developed, and schools and colleges founded. Although at first a man of democratic or even republican principles, Bratianu encouraged the formation and building up of a bourgeois class in the last years of his government.

Bratsberg, mountainous and picturesque co. on the coast of S. Norway, embracing the dist. of Telemarken; cap. Skien. Area, 5,865 sq. m. Forestry and agriculture are the main occupations of the inhabitants. Pop. 100,000.

Bratslav, or BRAZLAW, tn., Podolsk gov., Russia, 110 m. E. of Kamenetz Podolsk. Pop. 8,000.

Brattice, transverse partition of board, brick, plate-iron, or other suitable material, set up in the galleries of mines for the purpose of directing ventilating air currents. A brattice-cloth of heavy waterproof canvas is sometimes used temporarily.

Brattleboro, vil., Windham co., Vermont, U.S.A., on the w. bk. of Connecticut R., 7 m. N. of the Massachusetts boundary. It is the centre of the Vermont maple-sugar industry, and manufactures furniture and organs. Pop. 6,500.

Braun, AUGUST EMIL (1809-56), German archaeologist, born at Gotha, and died at Rome. He studied under Schelling and Gerhard, and became secretary to the Archaeological Institute of Rome in 1833. His chief works are *Griechische Götterlehre* (1851-55), *Vorschule der Kunstmythologie* (1854; Eng. trans. 1856), and *Die Ruinen und Museen Roms* (1854; Eng. trans. 1855).

Braun, KARL FERDINAND (1850), physicist, was born at Fulda, and occupied professorships successively at Marburg, Strassburg, Carlsruhe, and Tübingen, where he directed the construction of the Physical Institute. In 1895 he returned to Strassburg as professor of physics and director of the Physical Institute there. Braun's studies have been mainly devoted to electricity, magnetism, and telegraphy. His calculation, of the constant of gravitation, by the torsion balance method, is in close agreement with that made by Professor Boys. With the aid of Hartmann he constructed an ingenious apparatus for measuring the intensity of the magnetic field by means of a fine bismuth wire. His chief work, *Drahtlose Telegraphie durch Wasser und Luft*, was published at Leipzig in 1901. In 1909 he (jointly with Marconi) was awarded the Nobel Prize.

Braunau, tn., Bohemia, Austria, 20 m. E. of Trautenau; has a Benedictine abbey. Pop. 8,000.

Braunsberg, tn., E. Prussia, 35 m. s.w. of Königsberg; is famous as the seat of a Roman Catholic academy with university status, the Lyceum Hosianum, founded in 1579, which was a great Jesuit educational centre in the 17th century. Pop. 13,000.

Brava. (1.) Or BARAVA, more properly BARAWA, seapt. tn., E. Africa, 110 m. s.w. of Magadoxo; belongs to the sultan of Zanzibar. Its trade is chiefly with India and Arabia. (2.) The southernmost of the Cape Verde Islands. Although hilly, it is fertile. Area, 22 sq. m. Pop. 10,000.

Bravura (Ital.), a term applied to a style of musical composition or performance. It denotes florid brilliancy and technical dexterity.

Brawling, in England, is the offence of wilfully disturbing any meeting of persons lawfully assembled for religious worship, or misusing any preacher, teacher, or persons so assembled. It is punishable by a fine of £40. By the Brawling Act, 1830, similar offences committed in a place certified under the Places of Worship Act, 1855, are punishable with a fine of £5, or imprisonment for two months.

Braxfield, ROBERT MACQUEEN, LORD (1722-99), Scottish judge, was called to the Scottish bar in 1744, and gained the reputation of being the best feudal lawyer in Scotland. Raised to the bench in 1776, he became a lord of justice in 1780, and lord justice-clerk in 1788. His coarseness and cruelty on the bench won for him the names of the 'hanging judge' and the 'Jeffreys of Scotland.' An excellent study of him is given in R. L. Stevenson's *Weir of Hermiston* (1896). See also Ramsay's *Reminiscences of Scottish Life and Character* (21st ed.

1872); Grant's *Old and New Edinburgh* (new ed. 1887).

Braxy. See SHEEP—Diseases.

Bray. (1.) Par. and coast tn., N. Wicklow, Ireland, 12 m. S.E. by S. of Dublin; is a favourite seaside resort. A good harbour has been constructed. Fine scenery in the neighbourhood. Pop. 7,500. (2.) Par. (9,063 ac.) and vil., Berkshire, England, on the Thames, 1½ m. S.E. of Maidenhead. Pop. 3,000. See BRAY, VICAR OF.

Bray, ANNA ELIZA (1790-1883), English novelist. Of her novels, some are concerned with foreign life, others (the most popular) with the history of the great Devonshire and Cornwall families. Her best general work is her *Borders of the Tamar and Tavy* (1836; new ed. 1879), an account of local traditions. She also wrote a *Life of Handel* (1857); *The Revolt of the Protestants of the Cevennes* (1870); *Henry de Pomeroy* (1842); and *Warleigh* (1836). See her *Autobiography* (1884), and Southey's *Correspondence* (1849-50).

Bray, THOMAS (1656-1730), English prelate, was selected in 1695 as commissary for the bishop of London in Maryland, U.S.A., where he organized the Anglican Church. After his return home he held (1706) the living of St. Botolph-Without, Aldgate, London. Bray laboured all his life at providing parochial libraries at home and abroad, and his labours resulted in the foundation (1698) of the Society for Promoting Christian Knowledge. In 1701 he was likewise instrumental in founding the Society for the Propagation of the Gospel in Foreign Parts. See *Report of the Association of the late Rev. Dr. Bray and his Associates*, founded 1723, still published annually with memoir attached.

Bray, VICAR OF. Simon Aleyn was vicar of Bray, in Berkshire, England, from 1540 to 1588, dur-

ing the reigns of Henry VIII., Edward VI., Mary, and Elizabeth. He changed his faith three times, being twice a Papist and twice a Protestant, in order to adhere to his one principle, which was 'to live and die vicar of Bray.' The ballad, *The Vicar of Bray*, makes the vicar live in the reigns of Charles II., James II., William III., Anne, and George I.

Brayley, EDWARD WEDLAKE (1773-1854), English antiquary and topographer, was born at Lambeth, Surrey. By trade he was an enameller, and for long he was librarian and secretary of the Russell Institution (1825-54), of which he compiled a catalogue. He published many works on the antiquities and topography of England, including (along with John Britton) the *Beauties of England and Wales* (1801-15), and *Londoniana* (1829). See *Memoir* by J. Britton (1855).

Brazen Head, a mechanical contrivance which was fabulously reputed to possess the power of human speech, and was capable of acting as a kind of oracle. Several are mentioned in the old necromancers' and other books. One was made or owned by Pope Sylvester II. (c. 950-1003); another by Robert Grosseteste, bishop of Lincoln (1175-1253); another by Albertus Magnus (1193-1280); and another by Friar Bacon (1214-94), the most famous of all.

Brazil (officially styled *República dos Estados Unidos do Brasil*), the largest republic in S. America, is bounded on the N. by the Atlantic Ocean, Guiana, and Venezuela; on the W. by Colombia, Peru, Bolivia, Paraguay, and Argentina; on the S. by Uruguay; and on the E. by the Atlantic. Its greatest length is 2,660 m.; breadth, 2,700 m.; area, 3,270,000 sq. m.

Geographically, Brazil falls into two divisions—(1) the great plateau (4,000 to 5,000 ft.) of the

east and centre, its slopes being marked by rapids in the rivers flowing E. to the Atlantic, S. to the La Plata estuary, or N. to the Amazons; and (2) the great valley of the Amazons. The chief mountain ranges of the plateau, which generally trend N.E. and S.W., parallel to the coast, are Serra do Mar, Serra Geral, Serra da Mantiqueira (8,900 ft.), Serra dos Vertentes, Serra de Santa Martha, Serra dos Pyrencoas, and Serra de Piahy. Iron ore, precious stones, gold in quartz veins, arsenic, less frequently copper, lead, bismuth, and antimony, are found in the mountains. The great basin of the Amazons is bounded on the N. by ranges extending from the Tumuc-Humac Mts., separating it from the Guianas westward to Colombia, and on the S. by the Brazilian plateau.

Hydrographically, Brazil belongs for the most part to four chief drainage basins: (1) that of the Amazons in the N., this river flowing for nearly 2,000 m. through the country, and being joined within it by some of its largest tributaries—e.g. the Rio Negro, Madeira, and Tocantins; (2) the Rio Paranyba, also in the N.; (3) the Rio São Francisco in the E.; and (4) the Parana-Paraguay in the S. Besides these, several shorter rivers discharge direct into the Atlantic—e.g. the Jaguaribe, Jequitinhonha, Doce, Itapicuru, and Paranyba. Large lakes, caused by the expansion of the rivers, are very common in the Amazon basin. On the plateau they are also numerous; one of the largest (100 m. long by 25 broad) lies on the island of Bananal, in Goyaz.

Brazil is divided into three meteorological zones. (1.) The tropical (mean temp. 77° F.), which embraces the N. part of the country, and is subdivided into three regions: (a) the Upper Amazon, where the rainfall

amounts to as much as 78 in.; (b) Matto Grosso and the interior of the states bordering on the Atlantic, with heavy rains in spring and summer (45.9 in. on an average); and (c) the littoral, with rain in summer and autumn (58 in. of rainfall). (2.) The subtropical zone (mean temp. 74° at Rio Janeiro; rainfall, 44 in. between November and April). (3.) The temperate zone, with fine climate (mean temp. at Palmeiras, 63° F.; rainfall chiefly in winter and autumn, 40 to 60 in.).

The flora of the lands subject to inundation comprises forests of myrtle, rubber trees, bombax, mimosa, cinchona, etc., dominated by palms. Creeping plants are rare, but the ground grows tough grasses. American willow, plantains, palms, and the *Arundo saccharoides* (16 to 20 ft. high) are found on the banks of the streams. In the virgin forest beyond the reach of floods the trees are tall (200 ft. and more), and the trunks are draped with lianas bearing brilliantly-coloured flowers. The undergrowth consists of ferns and the phytelephas, yielding vegetable ivory. The Brazil nut, india-rubber, cocoa, vanilla, sarsaparilla, and cabinet woods are the main productions of these forests. Along the Atlantic, from Pernambuco to Rio de Janeiro, mangroves and *conocarpus* grow. The *campos* are grass-covered plains, in the hollows of which grow cypresses and palms.

As regards fauna, Brazil occupies almost the whole of a sub-region of the neotropical region which extends from Mexico to Tierra del Fuego, and contains nearly all its characteristic types. Monkeys, eight species of bats, the jaguar, the puma, several species of wild dogs, the anta or tapir (the largest mammal), the peccary, five species of deer, the capybara, the agouti, the sloth, the ant-eater, and two species

of armadillo, are among the animals. The birds are numerous and of brilliant plumage; fifty-nine species of humming-birds and twenty-six of 'Tanagride'; woodpeckers, goatsuckers, and the American ostrich belong to this region. The snakes are of forty-eight species, including the boa constrictor and anaconda. Fish number some 2,000 species, and insects are innumerable.

A census was taken in 1900, but the results were officially rejected as being unsatisfactory. The population, estimated at about 20,000,000, is very mixed—Europeans, 45 per cent.; Indian half-breeds, 32 per cent.; negroes, 15 per cent.; and pure Indians, 8 per cent. Population is densest in the coastal states, particularly in Rio de Janeiro, Sergipe, Pernambuco, Ceará, and Alagoas; Matto Grosso, Goyaz, and the Amazon states are sparsely inhabited. In the southern states of Parana, Santa Catharina, and Rio Grande do Sul there exist numerous colonies of Germans, amounting to nearly half a million persons in all. There are about an equal number of Italians scattered over southern Brazil.

On the Upper Amazon the chief occupation of the inhabitants is the collection of india-rubber (40,000 tons in 1909) and other forest products. Good tobacco and cocoa (especially in Para) are produced; while in the Atlantic states agriculture is more developed. Brazil, which produces three-fourths of all the coffee of the world, exports nearly £35,000,000 worth annually, chiefly from São Paulo, Minas, and Rio. In 1906 a scheme for the 'valorization of coffee'—i.e. to maintain the product at an artificial price—was originated by São Paulo, and in 1910 was still in operation. Sugar is grown in Maranhão and Piahy; and the great tobacco state is

Bahia. Paraguay tea (*maté*) is exported from Parana, and Minas Geraes is celebrated for its wines. The latter state is the chief mining region, yielding diamonds, gold, iron, manganese, copper, lead, etc. Gold is mined in the north-western and southern provinces, and in Goyaz; coal in Rio Grande do Sul and Santa Catharina. Manufactures are not developed, but the preparation of tobacco, sugar, etc., employs many of the people. The most important railways are the Central, from Rio de Janeiro to Minas Geraes and São Paulo (1,080 m.); the Mogiana in Minas Geraes and São Paulo (910 m.); the Sorocabana, in São Paulo (813 m., to be extended 250 m. further to reach the Bolivian frontier); the Paulista, in São Paulo (630 m.); the São Paulo-Rio Grande, in Parana and Santa Catharina (608 m. open, and some 1,500 to be constructed). A railway is also being constructed for a length of 210 m. (100 m. open) round the cataracts and rapids of the Madeira and Mamore rivers from Porto Velho to Guajara Mirim. In 1910 there were over 12,000 m. of railways open. The annual value of the exports is over £63,000,000, and of the imports, £37,000,000. Great Britain absorbs one-third of the foreign trade. The chief ports are Para, Fortaleza (Ceara), Recife, Bahia, Rio de Janeiro, and Santos. The capital is Rio de Janeiro, though a site has been selected for a new federal capital in the state of Goyaz.

The government is a republic, and the legislative power is in the hands of two chambers—the Senate of 63 members, three from each state (including the Federal District), a third of whom are replaced every three years; and a Chamber of Deputies, 212 in number (one for about 70,000 persons, with the restriction that not fewer than four shall be elected by each state). The president and vice-

president are elected for a term of four years by the direct vote of the people.

The external debt of the republic amounted in 1909 to £87,920,000. The government subsidizes the Roman Catholic Church, which is supervised by the archbishop of Bahia and eleven bishops; but otherwise there is absolute equality between all denominations. The army consists of about 28,000 men. Military service is by law compulsory, but conscription was only put in force in January 1908. The landmarks of Brazilian history commence with Cabral, who in 1500 discovered Brazil, named it *Tierra da Vera Cruz*, and claimed it for the Portuguese; and they took possession of the country by virtue of the treaty of Tordesillas between Spain and Portugal, confirmed by the Papal Bull of 1506. From that time until 1889 (except from 1580 to 1661) Brazil was governed by the Portuguese royal house. In 1624 the Dutch, instigated by Prince Maurice of Nassau, secured possession of a large part of the country, and kept it until 1661. In 1808 the prince regent of Portugal, João VI., transferred his court to Rio de Janeiro, but returned to Portugal in 1821. The following year Brazil declared its independence, and Dom Pedro was crowned emperor as Pedro I. In 1865 began the prolonged war with Paraguay, only ended by the death of Lopez in 1870. The emperor, Pedro II., was deposed in 1889 and a republic was declared. A constitution based upon the model of that of the U.S.A. was drawn up, the former provinces being converted into states. In 1892-5, insurrections in Rio Grande do Sul and elsewhere were suppressed, and the country has since that time rapidly developed.

See Wallace's *Travels on the Amazon and Rio Negro* (2nd ed.

1889); Bates's *The Naturalist on the River Amazon* (new ed. 1892); Agassiz' *A Journey in Brazil* (1868); Santa Anna Néry's *The Land of the Amazons* (Eng. trans. 1901); M. R. Wright's *The New Brazil* (1901); *The United States of Brazil*, by Bureau of American Republics (Washington, 1901); Oakenfull's *Brazil in 1910* (1910); Pereira da Silva's *Historia da Fundação do Imperio Brasileiro* (1864-82); Fialho's *Historia d'Estabelecimento da Republica do Brazil* (1890); Aker's *History of South America* (1854-1904); and Pierre Denis' *Brazil* (Eng. trans. 1911); and the "Brazilian Year Book."

Brazil, co. tn., Clay co., Indiana, U.S.A., 55 m. W.S.W. of Indianapolis; has extensive collieries, blast furnaces, rolling mills, and machinery works. Pop. 8,000.

Brazil Nut, the seed of *Bertholletia excelsa*, a tree belonging to the Myrtaceæ, indigenous to Brazil, Guiana, and Venezuela, where it attains a height of 100 ft. or more. The fruit is a hard hollow shell, nearly spherical, and about six inches in diameter, and contains from twelve to twenty-two nuts. The nuts are angular, owing to the way in which they are packed in the fruit, and have a white kernel from which an oil is pressed for burning.

Brazil-wood, or LIMA-WOOD, is the heart-wood of a tree, *Casalpinia crista*, and is the principal of a number of similar red-dye-yielding woods growing in Brazil, the W. Indies, and Japan. It was at one time largely employed in dyeing, but has now been replaced by aniline colours.

Brasing is a form of soldering by means of a kind of brass called spelter. The surfaces to be united are thoroughly cleaned, and heated to redness by a forge or a blow-pipe, spelter being applied to the joint in the form of

wire or filings, along with borax, which acts as a flux.

Brazos, one of the largest rivers of Texas, U.S.A. It rises in the Llano Estacado, in the w. part of the state, and flows in a general s.e. course to its mouth in the Gulf of Mexico. Length, 900 m.; navigable at high water for 300 m.

Brazza, the mediæval *Brattia* (Slav. *Brac*), isl. of Austria, Dalmatia; lies between the island of Lesina and the Dalmatian coast, s. of Spalato. The surface is hilly, reaching 2,580 ft. in Mt. San Vito. The principal products are fruits, such as olives, almonds, figs, and excellent wine. It also yields good marble. Area, 153 sq. m. Pop. 25,000. Chief town, San Pietro (pop. 3,200), on the N. coast. The port of Milna (pop. 4,700) is on the s. coast.

Brazza, PIERRE PAUL FRANÇOIS CAMILLE, COMTE SAVORGNAN DE (1852-1905), African explorer, of Italian parentage, was born on board ship at Rio de Janeiro, and educated at the Jesuits' College at Paris and the Naval School at Brest. In 1874 he was naturalized a Frenchman, and having entered (1870) the marine service, was sent in 1875 to explore the Ogowe R., in W. Africa. He followed (1876-8) the course of the river for 430 m., and proved the practicability of penetrating into Central Africa by way of the two water-courses of the Ogowe and the Alima. In 1879-80 he again explored the same region, and established two important scientific stations, Franceville and Brazzaville (N. shore Stanley Pool), and twenty-five other posts. He returned to Europe in 1882, and in 1883 was dispatched by the French government to complete his exploration of the Ogowe, to determine the basin of the Alima, and to conciliate the natives. In 1886 he became commissary-general of the French settlements

in W. Africa, in 1888 governor-general of French Congo, and in 1891 he explored the Sanga. Ill-health compelled him to retire in 1897. In 1902 he was awarded a pension of 10,000 francs by the Senate. See Bréard's *Les Voyages de Savorgnan de Brazza* (1884).

Brčka, tn., N.E. Bosnia, on the Save, 75 m. N.N.E. of Sarajevo; has large trade. Pop. 6,500.

Breaching Tower, a structure which played an important part in the siege of mediæval castles. In its original form it was a long wooden shed fixed on a wheeled framework, the roof being of great strength. From the roof hung a battering-ram, which could thus be swung to and fro against the base of the castle wall without the workers being exposed to the fire from the battlements above. See BELFRY.

Breach of Peace. The reign of law and order is the King's peace. Any act by which that order is disturbed is a breach of the peace. The term is not applied to any specific offence, but indictments always state that the offence charged is against the King's peace. In popular language, the term is generally confined to assaults, affrays, riots, and other acts of violence. A person who sees a breach of the peace being committed is entitled to arrest the offender. See ARREST.

Breach of Promise OF MARRIAGE is ground for an action for damages, either by a man or a woman, in Scotland or England. It is a good defence to prove that the defendant is an infant, or induced the promise by material misrepresentation—e.g. by concealing the fact of her in chastity. But a plaintiff need not disclose facts prejudicial to himself or herself—e.g. that he or she is a lunatic. Ill-health, or an already existing marriage if the plaintiff is unaware of it, is no defence. A

contract to marry must be carried out within a reasonable time. A plaintiff's evidence of a promise of marriage must be corroborated. See DAMAGES.

Breach of Trust. See TRUST.

Bread. Wheat-flour may be said to consist of starch, gluten (or a material capable of forming gluten), soluble albuminoids, fat, and mineral matter. It is the gluten which makes wheat-flour so suitable for bread-making. When flour is mixed with water it forms dough, and under suitable conditions of temperature this dough undergoes fermentation, carbon dioxide gas being given off. The gas, in trying to escape, causes the dough to expand and assume the appearance of a vesicular or spongy mass. This special kind of fermentation is known as panary fermentation. It is a slow process, and before completion organic acids are liable to be produced,

allowed to ferment for about six hours. A portion of flour is next mixed with the fermented potato mixture, and the whole is made into a slack dough with water. It is covered up, and allowed to ferment for about six hours: this forms what is known as the 'sponge.' The remainder of the flour is now mixed with the sponge, and the whole well kneaded, and covered up for one or two hours, when it is again kneaded, divided into portions of the required size, and baked.

The chemistry of the process is not thoroughly understood, but, speaking generally, it may be said that the yeast acts on the soluble albuminoids of the flour, and enables them to change the starch to some extent into sugar. The yeast now grows in the sugar, producing alcohol and carbon dioxide gas. The soluble nitrogenous constituents of the potato act as a yeast food. The yeast seems also

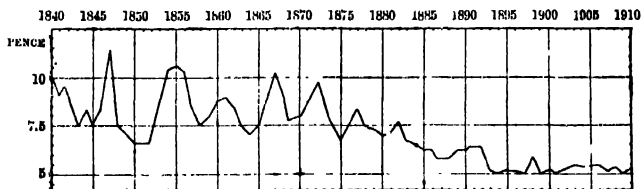


Diagram showing fluctuations in the Price of Bread.

rendering the bread sour. The process can be hastened by mixing the new dough with some sour dough from a previous baking. The modern method differs from the older mainly in the use of yeast (either brewer's or patent), by which the fermentation is started sooner, and the dough is put in the oven before it has time to turn sour. Potatoes are boiled with water, and are mashed in the liquor in which they have been boiled. Raw flour is added to the mass, which is

to act in some way on the gluten; for in bread prepared as above the gluten is soft and partially soluble, whereas in gluten separated from flour and baked it is hard and insoluble.

Salt is always added to the mixture before fermentation sets in. It produces a flavour in the finished bread, and acts as a retarder of fermentation changes.

During the process of baking the starch cells burst, the albuminoids are coagulated, while the imprisoned gas expands, making

the bread spongy and light. Some of the starch on the outside of the loaf is converted into dextrin. In Dr. Dauglish's method of bread-making (invented in 1859) fermentation does not take place, but the carbon dioxide gas is forced into the flour and water under pressure by suitable machinery, and the dough produced is at once placed in the oven. As can be readily understood, such bread lacks the flavour of the fermented variety, and aerated bread fails to please the palate. Bread made with baking-powder is of a similar nature, the carbon dioxide gas being produced from the constituents of the baking-powder acting chemically one on the other.

The difference between new and stale bread is due, not to loss of water, but to some molecular change in the constituents—most probably a dehydration of the carbohydrates.

The manufacture of bread in London is regulated by the Bread Act, 1822, and elsewhere in England and Scotland by a similar Act of 1836. The Sale of Food and Drugs Act, 1875-99, prescribes the following ingredients of bread: flour or meal of wheat, barley, rye, oats, buckwheat, Indian corn, pease, beans, rice or potatoes, common salt, pure water, eggs, milk, barm, leaven, potato or other yeast. Bread made for sale of other ingredients than those set forth in the act renders the baker liable to a penalty of £10, and publication of the conviction. If made wholly or partially of pease, beans, or potatoes, or any other sort of corn or grain than those specified in the act, it must be marked with a large Roman M; non-compliance entails a penalty. The mark is not required when only potato yeast is used. Standard bread, an attempt to 'standardize' the quality of the ordinary loaf, was put on the market

in England on an extensive scale in February 1911.

All bread except French or fancy bread or rolls must be sold by avoirdupois weight, and weighed upon request in the presence of the purchaser. The understood weight of the quarter loaf is 4 lbs. before baking. For bakehouse regulations see FACTORIES AND WORKSHOPS.

Breadalbane, dist., W. Perthshire, Scotland, comprising many lofty peaks of the S. Grampians, the highest being Ben Lawers (3,984 ft.). It is drained by the feeders of Loch Rannoch, Loch Tay, and Loch Lyon, and is rendered accessible by good roads through Glen Dochart, Glen Lyon, and the Rannoch distriet.

Breadalbane, EARLS AND MARQUISES OF, a noble Scottish family descended from the Glenorchy branch of the Campbells, of whom the most important are JOHN CAMPBELL (1635-1716), who obtained a patent creating him Earl of Breadalbane in 1681. He was largely instrumental in bringing about the submission of the Highland clans, and was responsible—with Sir John Dalrymple and the Duke of Argyll—for the massacre of the MacDonalds of Glencoe (1692).—JOHN CAMPBELL, SECOND MARQUIS OF BREADALBANE (1796-1862), took an active part in the Disruption controversy (1843), and after the formation of the Free Church of Scotland remained one of its most influential supporters. After his death the marquise became extinct, but was revived in 1885 in favour of GAVIN CAMPBELL (1851), the seventh earl, who succeeded to the earldom in 1871.

Bread-fruit. The bread-fruit tree (*Artocarpus incisa*) is a native of the E. Indies and the islands of the Pacific, where its fruit constitutes an important article of food. The tree grows to a height of about 40 ft., and has bold,

leathery leaves varying from a foot to a yard in length. The male flowers are borne in catkins, the female appear as globular heads. The fruit is of the size and shape of a melon. The young fruit contains a thick, white fluid which is pleasant and nourishing, but it is generally allowed to develop to a more solid condition before being used as food. It is usually cooked in a hole in the ground; it is cut into several pieces, and the core is removed; after which it is placed on heated stones for half an hour in layers, alternately with layers of leaves. It contains about three per cent. of albumin and fourteen per cent. of carbohydrates. In Britain the tree can be grown only in stove heat, considerable moisture being also necessary. A well-drained soil composed of loam, sand, and leaf-mould is desirable. In addition to *A. incisa*, other species of the genus are occasionally grown as stove trees, and being evergreen are valuable plants at all seasons. *A. Cannouti*, which grows to a height of about 8 ft., and has beautiful bronzy-red and crimson leaves about a foot in length, and *A. integrifolia*, the jack-fruit tree, which reaches a height of from 30 to 40 ft., and bears enormous fruits, containing seeds which are sometimes roasted and eaten, are two of the best known. The genus belongs to the order Urticacæ.

Bread Nut, the fruit of *Brosimum allicastrum*, of the Urticacæ, common in the W. Indies, etc. The nuts taste like hazel nuts, and, roasted or boiled, are used as bread, the leaves and shoots are eaten by cattle. The wood resembles mahogany.

Bread-root. See YAM and PSORALEA.

Bread-tree. See KAFFIR BREAD.

Breadbone Fever. See DENGUE.

Breakers. See WAVE.

Break Joint, the overlapping of similar pieces of timber, stone, or iron so that two joints should not occur at the same point, which would produce a weak structure. In masonry and bricklaying this is called 'breaking bond.'

Breakspare, NICHOLAS. See ADRIAN IV., POPE.

Breakwaters. See HARBOURS.

Bream (*Abramis*), fish belonging to the carp family, distinguished by the compressed and elevated body, the short dorsal fin, and the absence of barbels on the mouth. Of the seven European species, two are British, the common bream (*A. brama*) and the white bream (*A. blicca*). The former of these, like some other species, occurs sporadically in salt water; the so-called sea-bream (*A. rimba*) is found in salt, brackish, and fresh water. Bream are often exceedingly abundant in stagnant and slowly-moving waters, and on some parts of the Continent are the object of an important fishery. In Britain they are not highly esteemed as food.

Breast, popularly used for the thorax or chest, but here restricted to its anatomical sense—i.e. the milk gland or mamma of mammalia. Breasts exist in the male as well as in the female—in the former only in a rudimentary state, unless their growth has been excited by peculiar circumstances. In the female they are two hemispherical eminences in the pectoral region, corresponding to the intervals between the third and sixth or seventh ribs, and extending from the sternum to the axillæ. They are of small size before puberty, enlarge during pregnancy, and become atrophied in old age. The outer surface is convex, and has a small conical prominence, the nipple. The mamma consists of glandular lobes, of fibrous tissue connecting the lobes, and of fatty tissue in

the intervals between them. The lobes are connected by areolar tissue with blood-vessels and ducts. The ducts unite to form larger ones, which terminate in excretory ducts opening into the nipple. During pregnancy the alveoli or spaces in the glands enlarge, and the cells undergo rapid multiplication. The cells in the centre of the spaces at the commencement of lactation undergo fatty degeneration, and are eliminated as colostrum corpuscles. The peripheral cells of the spaces remain, and form in their interior oil globules, which are ejected into the lumen of the alveolus, and constitute the milk globules.

Diseases of the Breast.—Inflammation, or mastitis, is frequent during lactation, morbid or defective states of the nipple being the most common causes. It often passes on to suppuration or abscess. When actual congestion of the gland tissue exists, it should be reduced by mechanical means or bandaging. When inflammation is present, the local application of warmth, the application of belladonna, and a suitable support for the breast are required. Sometimes the milk accumulates, forming a cyst or galactocoele, which varies in size from time to time. The treatment consists in opening, removing the contents, and drainage. At other times a portion of the breast becomes the seat of chronic lobular mastitis, which can be reduced by local soothing applications and attention to the general health. Bier's congestion treatment is often of great value. The breasts are the seat of tumours—some non-malignant, as cysts, adenoma, and fatty tumour; others malignant, as sarcoma or cancer. Cancer of the breast occurs in two chief forms—scirrhous or hard, and encephaloid or soft. In both of these lym-

phatic glands are included, and the only hope of cure is early removal. Diseases of the nipple may be due to (1) defective formation, remedied by the use of an exhausting glass; (2) fissures, or cracked nipple, which may lead to abscess. Fissure is formed during suckling, is very painful, and should be guarded against by the use of astringent or spirit lotions during the later months of pregnancy; and while nursing, by perfect cleanliness, and by drying the nipples after suckling. Once fissured, the nipple should be protected by a shield, and dusted often with a drying antiseptic powder, such as oxide of zinc.

Breastplate. (1.) The Jewish high priest's breastplate was made of embroidered linen, wherein were inserted four rows of jewels, twelve in all, engraved with the names of the tribes of Israel. (See Ex. 28:15 ff.) (2.) A cuirass, formed at first of linen or of leather, afterwards of metal, bronze, or brass plates, generally without collars, worn by Egyptian, Greek, Roman, and Hebrew soldiers. See J. G. Wilkinson's *Antiquities*, i. (1878).

Breath. See RESPIRATION.

Breathing Exercises. See RESPIRATION.

Breccia, a rock consisting of angular fragments of any kind, united by a matrix. The shape of the components indicates that they have been produced by fracture, and have not been subjected to rounding by attrition. 'Fault breccia' is often found between the two walls of a geological fault, and is due to the breaking down of the rocky walls when grinding on one another. Mineral veins are often formed in fissures, and are brecciated later by movement of the walls. Another kind of breccia is produced when hot molten lava enters a lake or a stream: it is suddenly cooled and solidified, being at the same time shattered by the clouds of steam

which are formed. Breccias differ from conglomerates in the angular nature of their fragments, and in the method of their origin.

Breccy, tn., Manche dep., France, 22 m. S.E. of Granville. Pop. 9,000.

Brechin, par. (13,922 ac.), tn., parl. and royal bur., Forfarshire, Scotland, on the South Esk, and on C.R., 8 m. by road W. of Montrose; manufactures paper, linen, and sailcloth; has bleach-fields and distilleries. Its antiquities include the castle, the round tower, dating from about 1000, and the 12th-century cathedral. Pop. tn. 9,000.

Breckinridge, JOHN CABELL (1821-75), American lawyer, general, and statesman, was born near Lexington, Kentucky. He first saw service in the Mexican war (1846-7), and was a member of Congress (1851-5), being elected vice-president of the United States in the next year. For the presidency (1860) he was beaten by Lincoln, but was made a senator. This office he resigned in order to join the Confederate army, in which he rose to be major-general. He was prominent throughout the war, and was present at the battles of Shiloh, Murfreesboro, Chickamauga, Chattanooga, and Cold Harbour. In 1864 he was second in command during the Shenandoah campaign, and in the following year was secretary of war under Jefferson Davis. On the fall of the Confederacy he escaped to Europe, where he remained until 1868, when he returned and resumed the practice of law.

Brecknock, or BRECON, munic. bor. and mrkt. tn., cap. of Brecknockshire, on the Usk, 36 m. W.S.W. of Hereford; contains Christ College (originally a Dominican friary, and converted by Henry VIII. into a grammar school), and a congregational memorial college founded in 1869. There is a con-

siderable trade in lime, and in the manufacture of flannels and woollens. Mrs. Siddons, the actress, was born here in 1755. In the vicinity are Roman remains. Pop. 6,000.

Brecknockshire, or BRECON, an inland county of Wales, W. of Herefordshire. Length N. and S. 37 m.; breadth E. and W. about 30 m. Area, 740 sq. m. Pop. 55,000. The surface is very mountainous, and presents much picturesque scenery. The chief mountain ranges are the Black Mts. in the S.E., the Brecknockshire Beacons in the centre (highest point, 2,907 ft.), the Black Mts. in the S.W., and the Epynt Hills in the N. The principal rivers are the Usk, Wye, and Yrfon, and the upper courses of the Towy, Neath, Tawe, and Taff. The county forms part of the great S. Wales coal field. Iron, building-stone, limestone, lead, and copper also occur. The soil is very varied—fertile along the banks of the Wye and the Usk, but the higher mountainous districts are suited only for pasturage. Oats and corn are the chief crops. Coarse woollens and hosiery represent the textile industries, and there are iron works at Beaufort and Clydach, lead-mining at Nant-y-garw (8 m. from Rhayader), and slate at Cwm Yrfon (3 m. from Llanwrytyd). After the departure of the Romans, who conquered this territory in 70 A.D., Brecon formed a native Welsh state. In 728 the Saxons conquered the county, and in 1088 the Normans. In 1282 Llewellyn was slain near Builth. There are many remains of antiquarian interest, such as Roman stations, stone circles, and cromlechs. See T. Jones's *History of the county* (2 vols. 1805-9; reprinted 1898); Poole's *Illustrated History* (1886); Lloyd's *Historical Memoranda* (1899-1904); and E. A. Kilner's *Four Welsh Counties* (1891).

Breda, tn., prov. N. Brabant, Netherlands, 19 m. s.e. of Dordrecht. The Reformed Church contains fine burial monuments to the early counts of Nassau-Dillenburg. The old castle (1536-1696) is now used as a military academy. Carpets, cloth, and hosiery are manufactured. The defences were first laid out in 1534, and razed in 1876. The town capitulated to the Spaniards in 1581 and 1625, to the Dutch in 1590 and 1637, and to the French in 1793 and 1795. Here were signed the compromise of Breda in 1566, a protest of the Dutch nobility against the Spanish rule; the declaration of Breda in 1660 by Charles II. of England, in which he granted a free pardon and promised religious toleration; and the peace of Breda in 1667 between England and Holland. Pop. 28,000.

Bredahl, CHRISTIAN HVIID (1784-1860), Danish poet, born and died a poor peasant; an opponent both of the romantic poetry of Oehlenschläger and of the realistic novels of Gyllembourg-Ehrnsvärd; wrote *Dramatiske Scener* (1819-33; new ed. 1855).

Bredasdorp, Dutch rural dist. (pop. 6,600) and tn. (pop. 600) at the extreme s. of Cape of Good Hope, 100 m. e.s.e. of Cape Town, bordering on Cape Agulhas (long. 20° E.). The district was formerly famed for its wild ostriches.

Bredero, GERBRANT ADRIAENS (1585-1618), Dutch comic dramatist, was born at Amsterdam, and professed painting; but his reputation rests upon the farces *Kluchten* (1612), *Symen sonder Soeticheyd* (1613), and *Van den Meulenaer* (1613); the comedies *Moortje* (1615), and *Spaansche Brabander Jerolimo* (1618); and a volume of verse, *Groot Liedboek* (1622). His collected works were edited by Jan ten Brink and others in 1885-90 (3 vols.). See

a monograph in Dutch by Jan ten Brink (2nd ed. 1888).

Bröderode, HENRY, COUNT OF (1531-68), Dutch patriot, leader, with Egmont and Horn, in the revolt against the Spanish rule of Cardinal Granvella. In 1566 he presented to Granvella's successor, Margaret, Duchess of Parma, the famous 'Request,' the refusal of which led to the insurrection of the Gueux, or 'Beggars.' He died in Germany.

Bredow, a suburb of Stettin, Germany, with factories, iron works, and shipbuilding yards. The Atlantic liners *Deutschland*, and *Kaiser Wilhelm der Grosse*, and the *George Washington* (1908), the largest vessel in the German mercantile marine, were built here. It was absorbed in Stettin in 1900.

Bredow, GOTTFRIED GABRIEL (1773-1814), German historian, author of popular historical works, such as *Merkwürdige Begebenheiten aus der Weltgeschichte* (some 40 eds.), *Handbuch der alten Geschichte* (several eds.), *Weltgeschichte in Tabellen* (nearly a dozen eds.), *Chronik des 19. Jahrhunderts* (1808), etc. See *Life* by Kunisch (1823).

Brée, MATTHIAS IGNATIUS VAN (1773-1839), Flemish painter, was born at Antwerp, and studied art in Paris under Vincent. He won the Prix de Rome in 1797, and in 1827 was appointed director of the Academy at Antwerp. A painter of historical and allegorical subjects, he excelled in colouring. His principal pieces were *Napoleon's Entry into Antwerp*, *Death of Rubens*, and *Van der Werff at the Siege of Leyden*. His brother Philip (1786-1871) was also a painter of some note. The Van Brées painted in the somewhat conventional style of the 18th-century Flemish school.

Breech, Breechloader. See GUNS and RIFLE.

Breeches Bible. See BIBLE.

Breede, one of the largest and deepest rivers of Cape of Good Hope, rising about 33° s. and 19° E. and flowing s.e., to enter the sea at Port Beaufort.

Breeding, a term particularly applied to man's control over the pairing of domesticated and semi-domesticated animals. The domestication of all the more important components of what we may call 'stock' was effected in prehistoric times. Modern attempts to extend the list have not been attended with important success; and, in explanation of the relative failure, it may be suggested—(1) that the number of docile forms which can breed in captivity or under artificial conditions may actually be very small; (2) that domestication may require a longer time and a greater care in graduating the imposed restrictions than modern attempts have afforded; and (3) that in primitive times men may have possessed some secret in regard to the treatment of wild animals which has been lost with the growth of civilization. But although civilized man has not been able to add much to the roll of domesticated animals, he has done a great deal in the way of multiplying *breeds*, and of improving them along lines which he has selected for his advantage or amusement.

General Theory of Breeding.—In general theory, by some form of isolation, man secures the inbreeding of similar variants until the characters he desires to foster have become more or less prepotent in inheritance, and a new breed is established. His interference consists in selecting particular variants, and in restricting their reproductive radius—positively, by bringing similar forms together; negatively, by preventing intercrossing with dissimilar forms: and this may imply the elimination of many members of the young breed itself.

Complications.—The success of breeding experiments requires attention to a large number of factors which are still imperfectly understood. (1.) Much depends on the original choice of the character, or group of characters, which the breeder seeks to develop. There are well-known 'incompatibles' in the characters of organisms; and groupings of characters which may occur together in a casual freak may entirely fail to be realized in a stable breed. (2.) So far as we know, the breeder cannot expect success if the observed peculiarity which he starts with turns out to be an 'acquired character,' a 'modification' due to habits and surroundings, and not an inborn or germinal variation. (3.) It is easy to speak of securing the inbreeding of similars, and of preventing mixture with other breeds or sub-breeds; but in practice the difficulties are in some cases great—e.g. with pigeons, dogs, and cats. (4.) A stable breed may be established quickly, as in the case of the ancon sheep; but it may be the work of a lifetime or more, demanding infinite patience and the most sedulous care. (5.) The essential process of inbreeding may be pursued too far, and degeneration may set in, ending perhaps in impotence; or the introduction of 'fresh blood,' intended to save the desired breed, may be followed by results which give a quite new turn to the reproductive events. (6.) In many cases the development of a breed implies artificial conditions of life (surroundings, food, and habits), which complicate the problem by inducing 'modifications' or acquired bodily characters, theoretically, at least, quite distinct from those inborn or germinal peculiarities which form the only secure foundation of a breed. (7.) Moreover, though we cannot here discuss the details, the breeder has to take account of the age of

the parents, their bodily vigour, the relative ripeness of the germ-cells, the normal time of pairing, and a dozen other factors of importance in reproduction.

Some Results of Breeding Experiments.—It is not possible at present to formulate 'laws of breeding.' There are, however, some valuable results which will eventually be incorporated in a unified theory. We propose to refer to a few of these.

1. Carefully-kept records—*e.g.* of Basset hounds—have formed part of the basis of Galton's law of ancestral inheritance—an average statistical statement of the fact that inheritance is like a mosaic, the two parents contributing one-half, the four grandparents one-fourth, the eight great-grandparents one-eighth, and so on, of the total heritage of the average offspring.

2. There is no doubt that a variation sometimes crops up which is almost certain to be transmitted in its full strength, even although its possessor is paired with a form that does not possess the peculiarity in question. This prepotency of certain individual variations was probably operative in the origin of some of the more extraordinary breeds, such as ancon sheep, pug-dogs, and short-faced tumbler pigeons.

3. It seems certain that, given healthy stock, breeding in-and-in—*i.e.* within a small circle of blood relations—may be carried much further than most practical breeders are at present inclined to allow. The history of some breeds—*e.g.* of polled Angus cattle—shows in the early years a closeness of inbreeding which could hardly be exaggerated.

4. There is ample evidence to show that inbreeding in a healthy stock tends to develop the prepotency of the breed, giving fixity and stability and certainty of transmission to their peculiar

characters. Galloway cattle may be cited as a good example of an extremely prepotent breed.

5. The experiments of Ritzema-Bos and others on the inbreeding of rats and mice, and the less precise experience of breeders of valuable stock, show, on the other hand, that inbreeding may be carried too far, and may lead to degeneration, frequent abnormalities, abortions, and sterility. Sometimes, however, the collapse may be traceable to the artificial preservation of notably weak members who should have been detected and eliminated before they became reproductive. This leads to the question of intercrossing or outbreeding (*exogamy*) between members of different breeds.

6. While inbreeding induces fixity and prepotency, outbreeding or intercrossing of breeds is certainly provocative of variation. As Professor Ewart puts it: 'It is only necessary to interbreed half-bred animals, the offspring of two varieties that have long lived apart, . . . in order to obtain an epidemic of variation, to induce a more or less prolonged period of "sporting." Ewart's experiments with rabbits seem to prove this conclusively.

7. But the results of intercrossing different breeds are so diverse that they may be called unpredictable. Following Ewart, we may summarize the more striking results:—(1.) The offspring, down to minute details, may be all but intermediate between the two parents; but this is not very common. (2.) The offspring may resemble one of the parents. (3.) Some of the offspring may resemble one of the parents, and some the other. (4.) The offspring may combine, almost unimpaired, the more striking characters of both breeds; but this is very rare. In regard to pigeons, for instance, it seems very difficult to combine

the distinctive characters of two well-marked breeds. (5.) Sometimes new, or at least unexpected, characters appear in the offspring—e.g. a tailless rabbit, a spinning rabbit like a Japanese dancing mouse, a chestnut crow, and so on. (6.) The offspring of half-breeds are usually extremely variable. (7.) Sometimes the offspring, instead of resembling the parents, resemble former ancestors—a phenomenon which is, in some cases, interpretable as a reversion. See HEREDITY and VARIATION.

8. In 1865 Gregor J. Mendel published the results of numerous experiments on the hybridization of plants, of varieties of pea in particular, and formulated what is now called Mendel's law—an induction of profound importance in connection with breeding. His masterly work remained all but unknown till 1900, when De Vries, Correns, and Tschermak reached similar conclusions. These have been confirmed by the experiments conducted by Bateson and Saunders, for animals as well as plants; and no one should now theorize or experiment on breeding without first making himself familiar with Bateson's statement and vindication of Mendel's law. Within our space we cannot do justice to Mendel's discovery, but the gist of it, in Bateson's words, is this: 'The germ-cells or gametes produced by crossbred organisms may, in respect of given characters, be of the pure parental types, and consequently incapable of transmitting the opposite character; that when such pure similar gametes of opposite sexes are united together in fertilization, the individuals so formed and their posterity are free from all taint of the cross; that there may be, in short, perfect or almost perfect discontinuity between these germs in respect of one of each pair of

opposite characters.' See MENDELISM.

9. A careful scrutiny of the results of breeding does not seem to furnish any secure evidence in favour of the belief in the transmission of acquired characters or 'modifications;' but it is only fair to say that some expert breeders—e.g. Brewer—find the evidence satisfactory. The same remark must be made in regard to telegony—the supposed influence of a previous sire on the subsequent offspring of the same mother by a different father.

See W. Bateson and Miss E. R. Saunders, *Reports to the Evolution Committee, Royal Soc., Lond., 1901*—a very valuable record of experiments; W. H. Brewer, series of papers in the American journal *Agricultural Science*, 1892 and 1893; E. D. Cope, *The Primary Factors of Organic Evolution* (1896)—deals at some length with breeding, and expounds Brewer's conclusions; Ch. Cornevin, *Traité de Zootechnie Générale* (1891)—an important treatise; Charles Darwin, *Variation of Plants and Animals under Domestication* (1868)—the classic work on the variations of breeds; J. Cossar Ewart, *The Penicuk Experiments* (1899); 'Variation: Germinal and Environmental,' in the *Scientific Transactions, Royal Dublin Soc.*, vii. 353–378 (1901)—a valuable continuation of the book above cited; P. Goddes and J. Arthur Thomson, *The Evolution of Sex* (4th ed. 1901); V. Hensen, *Physiologie der Zeugung* (1881)—a valuable treatise, necessarily a little out of date; G. J. Mendel, *Versuche über Pflanzenhybriden* (Abh. Nat. Ver., Brünn), reprint in Ostwald's *Klassiker* (1901), also in *Flora* (1901), and trans. in *Jour. Roy. Horticultural Soc.* (1901)—a very valuable record of experiments not as yet duly appreciated; H. von Nathusius, *Vorträge über Viehzucht und Rassenkenntniss*

(1872); G. J. Romanes, *Darwin and after Darwin* (3 vols. 1893, 1895, 1897)—giving many illustrations of the evolutionary interest of breeding; A. Sanson, *Traité de Zootechnie* (2nd ed., five small vols., 1874-8; vol. ii. on laws and methods of breeding), and *L'Hérédité Normale et Pathologique* (1893)—paying much attention to breeding; H. Settogast, *Die Thierzucht* (2 vols. 5th ed. 1888)—a valuable treatise by an expert in touch with biological progress; H. de Vries, *Die Mutations-theorie*, vol. i. (1901); Alfred Russel Wallace, *Darwinism* (1889); August Weismann, *The Germ-Plasm* (1893), and *The Evolution Theory* (Eng. trans. 1904).

BREED SOCIETIES IN UNITED KINGDOM.—In addition to the permanent Royal Commission on Horse Breeding (President, Duke of Portland) the following societies may be mentioned:—

Horses.—Shire Horse Society; Clydesdale Horse Society; Hackney Horse Society; Hunters' Improvement Society; Polo and Riding Pony Society; Cleveland Bay Horse Society; Yorkshire Coach Horse Society.

Cattle.—Shorthorn Society; Hereford Herd-Book Society; Devon Cattle Breeders' Society; Sussex Herd-Book Society; English Jersey Cattle Society; Galloway Cattle Society; Ayrshire Cattle Herd-Book Society; Highland Cattle Society; Jersey Herd-Book Society; English Guernsey Society; Kerry and Dexter Herd-Book Society; Red Polled Society.

Sheep.—National Sheep Breeders; Oxford Down Breeders; Southdown; Hampshire Down; Wensleydale; Leicester.

Pigs.—National Pig Breeders' Association; British Berkshire Society; Large Black Pig Society.

Poultry.—National Poultry Organization Society; Poultry Club.

There is also a British Goat Society.

Breeze-fly. See CLEG.

Breezes, LAND AND SEA. Land and sea breezes which are purely local are met with in their most perfect form in hot countries. Towards noon a breeze sets in from the sea in the direction of the land, and dies slowly away towards sunset. About midnight a breeze begins to blow in the reverse direction, or from the land to the sea. Mr. H. F. Blandford's explanation (*Meteorological Vade Mecum*, ii. 70; 1877) is that when the air over the land is expanded by heat and raised, the upper strata gravitate off towards the cooler sea, and thereby produce an increase of barometric pressure at some distance from the shore. The air accordingly flows from this area of relatively high pressure towards that where pressure is lower, so that the sea breeze is first felt in the offing. During the night the contrary action takes place, the radiation over the land cooling the atmosphere, which contracts. The air above slides down from the sea, circles over the land, and pushing its way out, is felt as a land breeze. In the tropics the land and sea breezes blow with great regularity, except when masked by stronger winds, as during the monsoons. In England land and sea breezes do not attain any marked development, and extend only a short distance. See 'An Investigation of the Sea Breeze,' *Annals of the Astron. Observ., Harvard Coll.*, vol. xxi. (1890).

Bregenz (anc. *Brigantium*), tn. and summer resort of Austria, the cap. of Vorarlberg, stands at the E. end of the Lake of Constance, 121 m. N.W. of Innsbruck. It consists of the upper old town and the lower new town down beside the lake. Its chief feature is the National Museum of Antiquities, with many Roman re-

mains. The people are engaged in the silk industry, and make fancy ornaments. Pop. 8,000.

Brehm, ALFRED EDMUND (1829-84), German naturalist, the son of a Thuringian pastor. Brehm's most famous work was his *Illustriertes Thierleben*, or 'Animal Life' (10 vols.; latest ed. 1890-7; Eng. trans. 1895), which won immediate admiration from zoologists and travellers for the accuracy of its delineations, and to which Charles Darwin, among many others, acknowledged his indebtedness. But what Brehm himself regarded as 'the petchild of his pen' was his book on *Das Leben der Vögel* (1867-8; Eng. trans. by Labouchere and Jesse, 1874), a work addressed primarily to the general reader, although it is full of deep scientific interest. Brehm studied at Jena and at Vienna, and travelled extensively in Europe, Asia, and Africa. He was also director of the zoological gardens at Hamburg (1863-7), and founder and director of the aquarium at Berlin (1867-75).

Brehon Laws. The name 'Brehon' is the English form of the Gaelic *breitheamh*, 'a judge;' and the Brehon Laws denote the jurisprudence of ancient Ireland. The Gaelic MSS. embodying these laws, of which the *Senchus Mór* (Great Book of the Ancient Law) and the *Book of Aicill* are the most noteworthy, have been translated into English and published in a series of five volumes, with a sixth volume as *Glossary*, under the title of *The Ancient Laws of Ireland* (1865-1901). It is the work of half a century, authorized by a royal commission constituted on Nov. 11, 1852, and carried out by various distinguished scholars. Some of these laws are clearly of great antiquity. Sir Henry Maine, who ably summarizes them in his *Lectures on the Early History of In-*

stitutions (1875), observes 'some strong and even startling points of correspondence between the functions of the Druids, as described by Caesar, and the office of the Brehon.' Prof. Atkinson (*Ancient Laws of Ireland*, vi. 344-45; 1865), in drawing attention to the *Feinechas*, or customs and regulations of the *Feine*, a people whose influence permeates the Brehon Laws, draws the inference that these were a later caste of Teutonic invaders, whose formulated customs 'have strong resemblances to the *Lex Saxonica* and other codes of Germanic origin.'

Breisach, also known as ALT BREISACH ('Old Breisach'), and in Latin *Mons Brisiacus*, tn. in grand-duchy of Baden, Germany, stands on a basalt table above r. bk. of the Rhine, 14 m. W.N.W. of Freiburg. It was formerly one of the strongest fortresses of Germany, commanding the passage of the Rhine between France and S. Germany. In 1805 it was assigned to Baden, and its defences razed. Pop. 3,600.

Breisgau, in the middle ages, a *gau*, or district of Alemannia, being the country of the Germanic tribe of the Alemanni. It included the valley of Freiburg and the s. of the Black Forest, and embraced an area of 600 to 700 sq. m.

Breitenfeld, vil., dist. Leipzig, Saxony, 4 m. N. of Leipzig. Here, in 1631, Gustavus Adolphus of Sweden defeated the forces of the Catholic League of the empire, commanded by Tilly, and in 1642 the Swedish general Torstensson defeated the imperialists under the Archduke Leopold. For the third battle see LEIPZIG.

Breitinger, JOHANN JAKOB (1701-76), Swiss man of letters; born in Zürich; professor of Hebrew (1731) and Greek (1745) at Zürich; was an ally of Bodmer in his polemic against Gott-

sched and the artificial French conception of the import and essence of literature. His chief work was *Kritische Dichtkunst* (1740). See *Life* by H. Bodmer (1897).

Breitkopf, BERNHARD CHRISTOPH (1695-1777), founder of the Leipzig printing-house of Breitkopf, now Breitkopf and Härtel; established himself at Leipzig in 1718, and attracted notice by his admirable printing of Gottschied's works from 1726 onwards. His only son, JOHANN GOTTLIEB EMANUEL (1719-94), invented movable music type in 1750, improved the shape of the German characters, and devised a method of printing maps, pictures, etc., from movable pieces. Breitkopf was a friend of Goethe, and set his earliest poems to music. He also printed the musical compositions of Beethoven and Mozart, and wrote several valuable works on typography.

Breitmann, Hans. See LELAND, CHARLES GOLFREY.

Bremen. (1.) Free state of Germany, between the grand-duchy of Oldenburg and the Prussian province of Hanover, on both sides of the Weser and embracing the towns of Bremen, Vegesack, and Bremerhaven. Its total area is 99 sq. m. To the Imperial Diet it sends one representative, and has one vote in the Imperial Council. The state and town of Bremen form a democratic republic, governed by a senate of sixteen elected members (the executive), presided over by two burgomasters elected for four years, and an assembly of 150 citizens (the legislative authority). The old duchy of Bremen was assigned in 1648 to Sweden, whence it was sold in 1715 to Hanover, with which it is now incorporated. Pop. 285,000. (2.) Seaport town, German empire, on the Weser, 72 m. by rail s.w. of Hamburg. It is one of the busiest

ports in the empire, its exports and imports being each valued at about £85,000,000 per annum. The chief articles of trade are cotton and woollen goods, jute, rice, iron and steel, building materials, petroleum, and tobacco. The port (inclusive of Bremerhaven) is entered annually by some 5,500 vessels (tonnage, 4 millions). Bremen is one of the ship-owning ports of Germany, and is the headquarters of the N. German Lloyd (registered tonnage, 800,000) and the Hansa (tonnage, 260,000) lines. Bremen has extensive industries—shipbuilding, jute spinning, wool combing and cleaning, worsted spinning, and oil mills. The most notable edifices are the cathedral (built in 11th century) and the town hall. The public park, 337 ac. in extent, was laid out in 1866-84. Pop. 220,000. The town owes its origin to a bishopric founded in 788 by Charlemagne. It joined the Hanseatic League in the 13th century, and was very prosperous in the 16th. Its modern commercial prosperity dates from the founding of Bremerhaven in 1830. See Bippin's *Geschichte der Stadt Bremen* (1898).

Bremer, FREDERIKA (1801-65), Swedish novelist, was born at Tuorla, near Åbo, in Finland. In 1828 appeared *Axel och Anna*, the first of a whole series of romances with the common title of *Teckningar ur Hvardagslivet*. Of these, *Familien H...* (1833), *Grannarne* (1837), *Presidentens Döttrar* (1834), *Hemmet* (1839), *I Dalarne* (1845), all translated into English by Mary Howitt, are generally regarded as the best. She is the chronicler of Swedish middle-class life. In 1844 the Swedish Academy conferred upon her its gold medal. After 1840 her works generally assumed a more serious tone. Two years (1849-50) she spent in America, where her books

were much admired, and where she made the acquaintance of Longfellow, Lowell, Emerson, and Beecher. The result of her experiences is recorded in *Hemmen in nya verlden* (1853). The romance *Hertha* (1856), in which she advocated 'women's rights,' was very unpopular. From 1856-61 she travelled all over Europe, chiefly with the object of studying the religious life of the various nationalities; but none of them came up to her ideal religion. See collected works in Swedish (1868-72); works in English (trans. Howitt, 1846; another ed. 1849); also Howitt's *Twelve Months with Frederika Bremer* (1866); *Life, Letters, and Posthumous Works* (trans. Milow, 1868); R. Petorsen's *Frederika Bremer* (1892); and *Life* (in Swedish) by S. Adlersparre (1895).

Bremer Beiträge, abbreviated name of a literary journal which played a prominent part in German literature. It was published by Rabener, Gellert, and others as *Neue Beiträge zum Vergnügen des Verstandes und Witzes* (1745-8). In it were printed (1748) the first three cantos of Klopstock's *Messias*.

Bremerhaven, or BREMERHAFEN, scapt. tn. (outport of Bremen), Germany, belonging to the free state of Bremen; stands at the mouth of the Weser, on its r. bk., and 45 m. N.N.W. of Bremen. The town dates only from 1827, when Bremen bought land from Prussia, whereon she has since constructed three large harbour basins, besides docks (including the dry dock of the N. German Lloyd) and wharves. Pop. 24,000.

Bremersdorp, tn., Swazi'land, S. Africa, 80 m. s.w. of Lourenço Marques; until 1905 the seat of government.

Brendan, or BRENAINN, ST. (484-577), of Clonfert, called 'son of Finnloga' to distinguish him

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from St. Brendan of Birr, is the hero of the *Navigation of St. Brendan*, a very popular tale of the middle ages, which was carried to the Continent in the 9th century by Irish monks. He is said to have visited certain islands in the Atlantic, which suggest the familiar Greek legend of the Isles of the Blest. The islands of St. Brendan are represented on maps as being west of the Canaries as late as 1755, and in 1526 the Spaniards sent out more than one exploring expedition in search of them. Brendan visited St. Columba (563) at Iona. His day is May 16. See Schröder's *Sankt Brandan* (1871); Lanigan's *Eccles. Hist.*, ii. (2nd ed. 1829); *Early English Ballads*, Percy Soc., xiv. (1844); *Voyage of Bran*, ed. Kuno Meyer (1896); Wahlund's *Brendans Meerfahrt* (1900); and Moran's *Acta Sancti Brendani* (Dublin, 1872).

Brendan, ST. (?490-573), of Birr, now Parsonstown, in King's Co., Ireland. A disciple of St. Finnian of Clonard, he was the friend of Columba, and advised him to settle at Hy (Iona). His day is November 29. See Reeve's *Adamnan* (1857); *Martyrology of Donegal* (1864).

Brenham, co. seat of Washington co., Texas, U.S.A., 75 m. W.N.W. of Houston; manufactures cotton products and iron goods. Pop. 6,000.

Brennan, LOUIS (1852), inventor of the Brennan torpedo, was born at Castlebar in Ireland, and worked as a watchmaker in Melbourne. Recognizing the value of his torpedo, the British Admiralty invited him to England, and in 1882 Brennan was paid a retaining fee of £5,000, and engaged for three years at a salary of £2,000 a year and expenses, for which he was to give his whole services to the improvement of his invention. He was afterwards given a reward of

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£110,000 and a salary of £1,500 for five years. Brennan is still consulting engineer to the Government Brennan Torpedo Factory. His latest invention is the mono-rail.

Brenner. (1.) Village and summer resort of Austria, in Tyrol, near the head of the Brenner Pass, 20 m. S.S.E. of Innsbruck; has warm baths. (2.) B. Pass, connects the valley of the Inn with that of the Etsch (Adige). It is the lowest (4,485 ft.) of the great Alpine passes, and lay on the Roman highroad from Verona to Augsburg. It was made practicable for wheeled vehicles in 1772, and in 1854-7 a railway, 78 m. long, was constructed through it.

Brennus. (1.) The leader of the Gallic tribe of the Senones, who, in 390 B.C., after besieging Clusium, marched on Rome, defeated the Romans at the battle of the Allia, and took and burnt their city. The Senones were probably bribed to retire by a ransom. See Livy, v.; and Mommsen's discussion of the incident, *Roman History*, vol. i. (1894.) (2.) The leader of the Gauls who invaded Greece in 279 B.C. After being checked at Thermopylae, they devastated Ætolia, and advanced on Delphi; but the Delphians, aided by the nature of the ground, completely defeated them. Few escaped, and Brennus killed himself. See Curtzen's *Die Wanderungen der Kelten* (1861).

Brenta, riv., N. Italy; rises in the S. of Tyrol, flows E., S., and S.E., and originally discharged into the lagoon of Venice, but has been artificially carried round the S. end of the lagoon, so as to reach the Adriatic at Chioggia. Though its lower course is embanked, it is the cause of frequent inundations. Length, 106 m., of which 56 m. are navigable.

Brentano, CLEMENS (1778-1842), born at Frankfort, was

the son of Maximiliane la Roche, and brother of Bettina von Arnim, the correspondent of Goethe. In 1797 he was a student at Jena, where he became acquainted with the brothers Schlegel and other early romanticists. In 1801 he wrote *Godwi, oder das steinerne Bild der Mutter*, which reveals many traces of the influence of Goethe's *Werther* and *Wilhelm Meister*, still more of Jean Paul's works. Three years later he went to Heidelberg, and there, together with Achim von Arnim, edited (1805-8) the collection of popular ballads entitled *Des Knaben Wunderhorn*. On leaving Heidelberg he led an unsteady, wandering life; but in 1817 he became a devout Roman Catholic, and from 1818 to 1824 associated with Katharina Emmerich at Dülmen, a 'stigmatized' woman of overwrought religiosity. In 1817 he published *Die Geschichte vom braven Kaspar und dem schönen Annerl*, probably his best tale. Brentano was the black sheep of the romanticists—a vagabond with a love of shocking people—and in some respects resembled Heine. There is a good cheap edition of *Des Knaben Wunderhorn* in Meyers *Vollbücher*, an excellent account of its editors by R. Steig (*A. von Arnim und Clemens Brentano*, 1894), and an edition of his *Gesammelten Schriften* in 9 vols. (1852-5).

Brentano, LUDWIG JOSEF, 'LUJO' (1844), nephew of Clemens Brentano, was born at Aschaffenburg in Bavaria. A political economist of some note, he has made a special study of the working classes both from the historical point of view and from the actual present-day conditions. He has been professor of political economy at Breslau (1872), Strassburg (1882), Vienna (1888), Leipzig (1889), and Munich (1891). His chief works are *Die Arbeitergilden der Gegenwart* (1871-2), *Ueber das*

Verhältnis von Arbeitslohn und Arbeitszeit zur Arbeitsleistung (2nd ed. 1893), *Das Arbeitsverhältnis gemäss dem heutigen Recht* (1877), *Die Arbeitsversicherung* (1879), *Der Arbeiterversicherungszwang* (1881), *Die Christlich-soziale Bewegung in England* (2nd ed. 1883), *Agrarpolitik* (1897), *Ethik und Volkswirtschaft in der Geschichte* (1901), and *Die wirtschaftlichen Lehren des christlichen Altertums* (1902), *Der Unternehmer* (1907), *Wirtschaftspolitik und Finanzpolitik* (1909), etc. See his *Hours and Wages in Relation to Production* (Eng. trans. by Mrs. Arnold, 1878).

Brentford, mkt. tn., Middlesex, England, on riv. Thames and L. & S.W.R., 10 m. w. of St. Paul's, London. It is the county town of Middlesex. There are soap works, distilleries, breweries, and market gardens. Here, in 1016, Edmund Ironside defeated the Danes; and in 1642 it was the scene of Prince Rupert's victory over Colonel Hollis. Brentford and its 'Two Kings' figures in Buckingham's *Rehearsal* and in Cowper's *Task*. Pop. 15,000.

Brent Goose (*Bernicla brenta*), a near ally of the barnacle or bernicle goose. It resembles that species in general colour, in distribution, and in habit, except that it feeds by day, and not by night, as the former does. It weighs from 3½ to 4½ lbs., and is the best of the geese from the gastronomic point of view.

Brenton, SIR JAHLEEL (1770-1844), British vice-admiral, served in the *Barfleur* at Capo-St. Vincent in 1797. He was flag-captain to Saumarez in the actions in Algeciras Bay and the Gut of Gibraltar in 1801; was wrecked, and taken prisoner in the *Minerve*, off Cherbourg, in 1803, and imprisoned until 1806, when he was exchanged; assisted in the reduction of the Ionian Islands (1809); and, in the *Spartan*, de-

feated a Franco-Neapolitan flotilla in May 1810. For this he was made a baronet in 1811, and a K.C.B. in 1815. He was subsequently commissioner at the Cape of Good Hope, and lieutenant-governor of Greenwich Hospital. At the time of his death he was a vice-admiral of the White. See *Life* by Raikes (1846).

Brentwood, eccles. par. (459 ac.) and tn., Essex, England, 11 m. s.w. of Chelmsford; has a free grammar school founded in 1537, and part of a chapel built by St. Osyth in 1221 in memory of St. Thomas à Becket. Pop. 5,000.

Brenz, JOHANN (1499-1570), German theologian, the Protestant reformer of Württemberg, where he had held office as canon until converted to Lutheranism. He took part in the Marburg Disputation (1529), the Augsburg Conference (1530), and the Conferences of Hagenau (1540), Worms (1540), and Ratisbon (1541 and 1546); was one of the authors of the Württemberg Confession; and his Catechism ranks next to Luther's. In 1553 he became superintendent of Stuttgart, whither he betook himself on the issue of Charles v.'s 'Interim,' which he strenuously opposed. See Hartmann and Jäger's *Life of Brenz* in German (1840 and 1862).

Brescia. (1.) Province (area, 1,806 sq. m.), N. Italy, between Tyrol, L. Garda, and river Oglio. The principal products are rice, maize, wine, and fruits. Silk, machinery, and leather are the chief manufactures. Pop. 575,000. (2.) Town (anc. *Brixia*) and episc. see, cap. of above, 50 m. E.N.E. of Milan. Its chief manufactures are woollens, linens, and silks, and it is famous for its iron and steel wares, especially arms for the Italian army. The cathedral, of white marble, begun in 1604, was not finished until 1825. The town hall dates from 1499-1775, the Broletto (the assembly

hall of the Brescian republic) from the 12th century. Several of the churches contain valuable pictures by native painters, such as Toretto (b. 1498) and Romanini (b. c. 1485), also by Paolo Veronese and Tintoretto; and its museums and picture galleries are very fine. There are statues to Garibaldi (1889) and Arnold of Brescia (1883), a reformer of the church in the 12th century. The town was destroyed by Attila in 452. It held a leading place in the Lombard league against Frederick Barbarossa in the end of the 12th century. From 1516 to 1797 it was subject to Venetian rule. In 1849 it was taken by the Austrian general Haynau. Ten years later it was annexed by Sardinia. The Brescian school of painting flourished in the 16th and 17th centuries. Pop. 75,000.

Breslau, tn., cap. of prov. of Silesia, Prussia, on the Oder, 224 m. S.E. of Berlin, is commercially and educationally the principal city in E. Germany. It consists of the old town and six suburbs. Near the imposing and richly-decorated town hall (14th century) are fine statues to Frederick the Great, Frederick William III. of Prussia, and Blücher. The oldest ecclesiastical edifices are the cathedral and the churches of St. Elizabeth and St. Magdalene, all of the 13th century. Among the most important buildings are the university, the archiepiscopal palace, and the palace of the king of Prussia. The chief industries are the manufacture of machinery, beet sugar, and chemical manures; printing, brewing, distilling, and flour-milling. Breslau is an important railway junction and commercial centre. It has been the see of a bishop since the 11th century. It was subject to Austria from 1526 to 1741, at which latter date it was conquered by Frederick the Great. Pop. 510,000. See *Stade's Breslau* (1895).

Bressay, par. (7,738 ac.) and isl., E. Shetland, Scotland, separated from Mainland by Bressay Sound, part of which forms the harbour for Lerwick; 142 m. by steamer N.W. of Aberdeen. Parish includes the islands of Noss and Inner and Outer Score. Flagstones and slates are quarried. Pop. 700.

Bresse (Lat. *Brissa, Bressia*), anc. prov. of France, now forming the dep. of Ain. It formed part of Burgundy, and in 1601 was definitely assigned to France by Henry IV.

Brest, most important naval harbour of France, on the Atlantic, dep. Finistère. There are naval schools, an arsenal employing 9,000 hands, and various hospitals. The harbour is on the river Penfeld, separating Brest from its suburb Recouvrance. The castle, built in the 12th century, was modified by Vauban. There are manufactures of candles, cork, hats, ropes, soap, and leather. Strawberries, vegetables, and superphosphates are the principal exports. Brest was in the hands of the English from 1342 to 1397, and resisted afterwards several English attacks (1513 to 1694). Brest Roads are formed of an irregular bay, 14 m. long by 7 m. wide, connected with the ocean by a channel on the N., called the Goulet. Pop. 85,000.

NAVAL BATTLES OFF BREST.—In 1512 an English fleet, under Lord Edward Howard, with forty-five sail, made the mouth of Camaret Bay on August 10, just as the French, with thirty-nine sail, were leaving Brest. A bloody but indecisive battle followed. The battle is sometimes known as that of St. Mathieu. Lord Edward Howard, with forty-two ships, besides small craft, blockaded Brest and the French fleet within it. While he lay before it, a force of French galleys from the Mediterranean entered the neigh-

bouring bay of Blanc Sablon. On April 25, 1613, Howard, with his boats, attempted to cut them out; but his little force was repulsed with heavy loss, and the lord high admiral himself was driven overboard and drowned. In 1694, when Brest was held by the Catholic league and its Spanish sympathizers, it was blockaded by a small British squadron under Sir Martin Frobisher, who was mortally wounded while serving ashore in the final and successful assault that was made on it by the allied troops of Henry IV. of France and Queen Elizabeth.

Brest Litovsk (*Brześć*), tn. of Grodno gov., Russia, centre of industry, and important fortress, 121 m. by rail s. of Grodno city, on the (Polish) Bug, important junction at crossing of Moscow-Warsaw and Königsberg-Odessa Railways. Trade in grain, wood, cattle; tobacco manufacture; military college. It is the see of a Greek Orthodox bishop and of a Catholic Armenian bishop, who is head of the Armenian Catholic Church in Russia. Pop. 52,000.

Bretagne. See BRITTANY.

Brethren, APOSTOLIC. (1.) A Gnostic sect of the 3rd and 4th centuries, which condemned marriage and followed Christian communism. (2.) A German communist body of the 12th century, near Cologne, which rejected the Roman Church and professed to revive the original doctrines of the apostles. (3.) A North Italian sect of the 13th and 14th centuries, which urged a return to the primitive communism of the apostolic church. Its founder, Gerhard Sagarelli, a Parma weaver, was, after twenty years' successful preaching as an apostle, burned at the stake (1300), and the brethren suffered persecution. From 1290 his adherents began to denounce infant baptism, the dogma of purgatory, invocation of saints, prayers for

the dead, and the corrupt lives of the clergy. His successor, Dolcino of Novara, an able and learned man, maintained himself in arms against Pope Boniface VIII. for two years, but was captured, and was burned at the stake at Vercelli in 1307. See BROTHERHOODS and CHRISTIAN BROTHERS.

Brethren of the Common Life, semi-monastic associations founded by Gerhard Groot at Deventer, in Holland, about the year 1376, for teaching children, copying books, and generally labouring and living in Christian communion. They were likewise known as Brethren of Good Will, Hieronymites, Gregorians, and Collation Brethren. After Groot, the leaders were Radewin and Zerbolt. There were also bands of women working for similar purposes. The most illustrious member was Thomas à Kempis, and the most distinguished pupil of its schools was Erasmus. See Ullmann, *Reformers before the Reformation* (Eng. trans. vol. ii. 1855); Kettlewell, *Thomas à Kempis and the Brethren of Common Life* (1882); Hoening, *Die Brüder des gemeinsamen Lebens* (1894).

Brétigny, vil. in dep. Eure-et-Loir, France, 6 m. S.E. of Chartres. By the treaty of Brétigny, May 8, 1360, Edward III. of England gave up his claim to the throne of France; retained Gascony and Guienne; abandoned Anjou, Maine, Normandy, and Touraine; and agreed to release King John on receipt of a ransom of 3,000,000 crowns. See Cosneau's *Les Grands Traités de la Guerre de cent ans* (1889).

Breton CAPE. See CAPE BRETON.

Breton, Jules Adolphe Aimé Louis (1827-1906), French painter, born at Courrières (Pas-de-Calais), was pupil of De Vigne and Drolling, and a master of the realist

school of peasant-painters. He was in touch with the Barbizon school, and one of the first to follow Millet and Courbet in the revolution against academic tradition; but his subjects were always less uncompromising and more convincing than theirs, and this tendency towards idealization became still more developed in his later works. His colour is beautiful, his composition simple and attractive. His best pieces include *Blessing the Fields* (1857), *Return of the Fleeters* (1859), *Evening and Weeders* (1861), *Potato Harvest* (1868), *The Fountain* (1872), *St. John's Feast* (1875). See Breton's autobiographical *Vie d'un Artiste* (1890), and Vachon's *Jules Breton* (1899).

Breton, NICHOLAS (?1545-1626), English poet and pamphleteer, was son of a London merchant, and stepson of George Gascoigne. Some charming pastoral lyrics in the Spenserian vein are to be found in his *Passionate Shepherd* (1604), and in the miscellany *England's Helicon* (1600). See *Collected Works*, ed. A. B. Grosart (1876); *Selections*, Grosart, 'A Power of Delights' (1893); and A. H. Bullen's *Poems, chiefly lyrical, of the Elizabethan Age* (1890).

Bretón de los Herreros, MANUEL (1796-1873), Spanish scholar and dramatist, was perpetual secretary to the Royal Spanish Academy and chief of the National Library; an indefatigable writer of poems, articles, sketches, and tales, but more memorable as a dramatist. Much of his work still holds the stage. Some of his most notable pieces are *A Madrid me vuelvo* (1828), *Marcia* (1832), and *Un Norio para la Niña* (1836). The best collected edition of his works is that of Madrid (1884). See the Marquis of Molins's *Bretón de los Herreros* (1883), and Piñeyro's *El Romanticismo en España* (1904).

Breton Language and Literature. Breton (Fr. *Bas Breton*) is a Celtic dialect spoken in Brittany. Together with Welsh and the extinct dialect of Cornwall, it constitutes the Cymric group of the Celtic languages. It was carried to France by the British Celts who fled from England upon the invasion of the Anglo-Saxons between the 5th and 6th centuries. It is sometimes called Armorican, and is spoken at the present time by about 1½ million persons. Although it comprises several dialects, four of them only are of any moment, and of these the most important is the so-called Léon dialect. A good grammar and dictionary of this dialect were published by Le Gonidec (3rd ed. 1847-50), and a good French and Breton dictionary (of the same dialect) by Froude (new ed. 1876). The oldest fragments of Breton literature belong to the 14th century—e.g. *Le Mystère de Saint Nonne* (ed. Le Gonidec, 1837) and *Le Grand Mystère de Jésus* (ed. La Villemarqué, 1866). The Breton language has long ceased to be used by the gentry; on the other hand, an extensive popular literature has been developed, to which special attention was drawn in the 19th century. The popular *contes* and legends are characterized by the exceptionally large place which sea stories and miraculous narratives occupy in them. (See Luzel's *Contes Bretons*, with Fr. trans. 1870.) In 1863 Luzel published, further, a good specimen of the Breton mystery in *Sainte Tryphine et le Roi Arthur*. The popular songs are divided into two distinct types—the *gwerz*, or historic poems, and the *sonn*, or lyric poetry. Collections were published by La Villemarqué under the title *Barzaz-Breiz* (1839; 7th ed. 1867; Eng. trans. by Tom Taylor, 1865); by Luzel in *Gwer-*

ziou Breiz-Izel (2 vols. 1868-74), *Contes Bretons* (1870), and *Sonion Breiz-Izel* (2 vols. 1890). See E. Renan's 'La Poésie des Races Celtiques,' in *Revue des Deux Mondes* (1854), and *Souvenirs d'Enfance et de Jeunesse* (1883); D'Arbois de Jubainville's *Les Celtes et les Langues Celtiques* (1883); Quélilien's *Chansons et Danses des Bretons* (1889); and *La Revue Celtique*.

Bretschneider, HEINRICH GOTTFRIED VON (1739-1810), Austrian satirist, who, after travelling in England, France, and Hungary, and making the acquaintance of Nicolai, Lessing, Gellert, Swedenborg, and Goethe, published an account of his travels, as well as numerous volumes of satires and poems. See Linger, *Denkwürdigkeiten... von Bretschneider* (1892).

Bretschneider, KARL GOTTLIEB (1776-1848), German theologian, was born at Gersdorf, Saxony. Of his numerous works, the chief are: *Handbuch der Dogmatik der evangelisch-lutherischen Kirche* (1838); *Probabilia de Evangelii et Epistolarum Joannis Apostoli Indole et Origine* (1820); *Melanchthoniana Pædagogica* (1834; new ed. 1892); *Selbstbiographie* (1851).

Brett, JOHN (1830-1902), British painter, who began to exhibit in 1856, and was elected A.R.A. in 1881, is the chief exponent of the pre-Raphaelite method as applied to seascapes and landscapes. His *Stonebreaker* (1858) was so much admired by Ruskin that he commissioned the fine *Val d'Aosta* (1859). *Britannia's Realm* (1880) is in the Tate Gallery, London. *The Norman Archipelago* (1885) in Manchester, and *North-west Gale off the Longships Lighthouse* in Birmingham. See Percy Bates's *English Pre-Raphaelite Painters* (1899).

Brettes, LOUIS JOSEPH, VICOMTE DE, French traveller; born at Limoges. In 1877-83 he

visited the N.W. coast of Africa and the S. of Algeria. In 1886-9 he made an expedition to the Gran Chaco in S. America; in 1890-1 he explored the Sierra Nevada de Santa Marta in Colombia; and in 1892-3, at the request of the French Board of Trade, he made another journey to Colombia, when he surveyed the province of Magdalena. See Mallat de Bassilan's *L'Amérique Inconnue, d'après le Journal de Voyage de J. de Brettes* (1895).

Bretts and Scots, LAWS OF TUE. In the *Regiam Majestatem* there are, in the words of Hill Burton, 'some fragments of a mysterious old code, called the Laws of the Bretts and Scots,' evidently a survival of Cymric and Gaelic jurisprudence in Scotland. Edward I. of England, in his ordinance made for the government of Scotland (1305), specially cancels these laws, as unsuited to the existing civilization of Scotland. According to Burton, the element which made them so repugnant to the French ideas of Edward and his nobles was the practice of dealing with crimes of violence as only affairs for pecuniary settlement, regulated according to the rank of the offender. This feature, the only known characteristic of these laws, seems to connect them with the Brehon Code. But the ideas of this ancient code were embodied in Scottish law until recent times, under the form of 'letters of slains' or of 'assythement.'

Bretwalda, or BRYTENWALDA, a title of dignity among the Saxon invaders of Britain, borne as early as 477 A.D. by Ella of Sussex, in recognition of his victory at Anderida. That it was not a supreme title is shown by the fact that Ethelbert of Kent and Rædwald of East Anglia held it simultaneously. The etymology of the word is uncertain. See Elton's *Origins of Eng. Hist.*, p. 392 (1882).

Breughel, or BRUEGHEL. (1.) **PIETER** (c. 1530-69), Flemish painter of peasant life, country fairs, and weddings; named from the village of his birth, and surnamed the 'Droll.' He was a pupil and the son-in-law of Koek. (2.) **PIETER** (1564-1637), his son, painted sieges, conflagrations, hags, witches, devils; hence called the 'Infernal.' (3.) **JAN** (1568-1625), a younger brother of the second Pieter, the best of the three, called the 'Velvet,' from his dress; painted miniatures, flowers, and landscapes—e.g. *Paradise, The Four Seasons*—and collaborated with Rubens in the great painting *Adam and Eve in Paradise* (in the Louvre), the figures in which were painted by Rubens. See Michel's *Les Brueghels* (1892).

Breun, JEAN E., COMTE DE L'HÔPITAL (1862), portrait painter, of French birth, was educated and resides in London. Among his best-known portraits are *Princess Victoria, Princess Henry of Pless, Countess of Londeborough, Earl and Countess of Carnarvon, Sir Redvers Buller, W. G. Grace, and Madame Patti*.

Breve. See **MUSIC**.

Breve, an old Scots law term signifying a short, compendious writ issued from the crown to a judge, ordering him to try by jury the points outlined in the writ. Procedure by breve was introduced into Scotland by James I.

Brevent, of the N.W. of Chamonix, one of the finest view-points (8,284 ft.) for the range of Mont Blanc.

Breves, tn., Marajo I., Para state, Brazil, 140 m. w. of Belom. Pop. about 10,000.

Brevet, in the British army. In recognition of meritorious service in the field, or for service of an exceptional nature other than in the field, it is the custom to promote an officer above his regi-

mental rank—i.e. that which he holds in his regiment. No brevet promotion, however, can be granted until an officer has served six years in the army, and is of the rank of captain. The highest brevet rank is that of colonel. An officer wears the usual badges, and receives allowances, but, with the exception of brevet-majors, draws no extra pay. Brevet-majors receive an additional 2s. per diem. When parading with his unit a brevet officer takes post according to his regimental rank; but he assumes his seniority by brevet when with other troops.

Breyell, tn., Rhenish Prussia, 15 m. w. by s. of Crefeld; has silk mills. Pop. 6,000.

Breviary, a book containing the divine office, which every Roman cleric in holy orders and choir, monks, and nuns are bound to recite daily. This recitation is the continuation, though in a more elaborate and systematic form, of a practice which was in use from the infancy of the church, which adopted it from the synagogue. The Roman office in its complete state dates from the latter part of the 7th century or the beginning of the 8th, and continued unchanged for at least four hundred years. In the 13th century it received various additions, chiefly taken from the Franks; and this, which was called by Gregory IX. the 'modern office,' was given by him to the Franciscans in the form of a breviary, properly so called, in 1241. This breviary was introduced into the Roman basilicas under Nicholas III. in 1280, and into the churches of Avignon in 1337 by Benedict XII. The Council of Trent called for a revision of the breviary, and the result was the breviary (1568) of Pius v., with subsequent amendments by Clement VIII. (1602) and Urban VIII. (1632), the breviary of the latter being that now in use. The psalter is

the backbone of the breviary. Around the psalms have grown up antiphons, responses, lessons, hymns, collects. The breviary is divided into four parts—viz. a winter, spring, summer, and autumn quarter. Each part contains (1) the *Psalter*—i.e. the psalms arranged for each day of the week; (2) the *Proprium de Tempore* (the proper of the season)—i.e. hymns, antiphons, chapters, and lessons, with responsories and versicles for each day of the church year, including the movable feasts; (3) the *Proprium Sanctorum* (the proper of the saints)—i.e. prayers, lessons, responsories, etc., for the immovable feasts; (4) the *Commune Sanctorum* (the common of the saints)—i.e. psalms, with antiphons, lessons, etc., for feasts of a particular class (e.g. of the Blessed Virgin, of a martyr, etc.): to this division the little office of the Blessed Virgin, the office of the dead, and the penitential and gradual psalms are added; (5) a supplement containing offices which do not bind the whole church, and are recited only in particular countries. Every day the office begins with matins and lauds, which form together the longest of the seven canonical hours. These are followed by prime, terce, sext, none, vespers, and compline. In religious communities a shorter office is substituted, and in churches the services are usually combined—matins and lauds at 7.30 or 8 a.m.; prime, terce, sext, and none at 9.30 or 10; and vespers and compline at 4.

It was on the lines of the breviary that the English order of Morning and Evening Prayer was drawn up. They retain their old features so fully that the English Prayer Book may be regarded as an improved breviary and missal. A strong feature of the modern breviary is the skill and taste which have been brought

to bear upon the translation (by Newman, Neale, and others) of the hymns, as shown in the edition of the breviary edited by the third Marquis of Bute (1879). See Grancolas's *Commentarius Historicus in Romanum Breviarium*, Batiffol's *Histoire du Bréviaire Romain* (1893), and article in *Catholic Encyclopædia*, vol. ii. (1908). See also LITURGY.

Brevier. See TYPES.

Brewer, EBENEZER COBHAM (1810–97), born in London, and studied at Cambridge. He is best known as the compiler of the *Dict. of Phrase and Fable* (new ed. 1895); *Reader's Handbook* (1898; new ed. 1902); *Dict. of Miracles* (1884); and *The Historic Notebook* (1891).

Brewer, JOHN SHERREN (1810–79), English historical writer, was chaplain to the workhouse of St. Giles-in-the-Fields and St. George, Bloomsbury, London (1837); professor of classical literature (1839) and of English literature (1855) at King's College, London; and for a short time edited the *Standard*. In 1856 he began a calendar of *State Papers* (4 vols. 1856–76) of Henry VIII. The prefaces to the various volumes have been edited by Gairdner (1884), under the title, *The Reign of Henry VIII*. See *English Studies*, edited by Wace, with *Memoir of Brewer* (1881).

Brewing. The process by which malted grain is treated with hot water to produce a wort. This is boiled with hops, filtered and cooled, and is then made to undergo alcoholic fermentation. In the preparation of native beers, such as *bousa* (Abyssinian beer), *samshoo*, and others, spontaneous fermentation is allowed; but in civilized countries the greatest care is taken to prevent this process. Beer is a beverage of the most remote antiquity. The Egyptian god Osiris is said to have taught mankind to make a drink from barley not much

inferior to wine. Isidorus (5th century A.D.) describes the method employed by the ancient Britons: 'The grain is steeped in water and made to germinate; it is then dried and ground, after which it is infused with water, which, being fermented, becomes a pleasant and intoxicating drink.'

Only since the middle of the 19th century has beer been brewed on scientific principles. This change is due to the great advances made in chemistry, bacteriology, and agriculture. Of all the members of the grass family, barley is the most convenient grain for the manufacture of beer; and of this only the two-rowed variety is suitable for malting purposes. Some of the more important varieties are Chevalier, Champion, Big Ben, Goldthorpe, Golden Melon, and Goldendrop. When fully matured these barleys are plump, thin-skinned, bright, and yellowish in colour. In weight they average 56 lbs. per bushel, and yield a malt of 42 lbs., showing a loss of about 25 per cent. in

is within the husk; it yields a starch comparatively free from fatty matter; it contains a relatively high proportion of suitable nitrogenous matter and a large amount of starch.

Light chalky and dry gravelly loams, or medium to light soils, produce the best malting barleys; but much depends on the season and climate, which should be warm and rather dry. Strong lands and soils rich in humus produce heavy crops of coarse barleys; while heavy and clayey soils yield a dull-looking barley, which contains too high a percentage of glutinous matters.

Malting.—Two systems are in general use—the old *flooring* and the *pneumatic*. The chief objects to be attained in malting are: (a) the modification or rendering naked of the starch cells; (b) the development of the diastatic, proteolytic, and other enzymes present in the grain; and (c) alterations of a physical nature by growth of the acrospire and rootlets. These changes are brought about by germination under starvation conditions. Before malting, barleys are sweated on a kiln for some hours at about 105° F., and stored so as to mature and assist their vitality. They are next freed from all foreign seeds, dead and broken corns, dust, dirt, pieces of string, and other particles, by special machinery, and finally graded into sizes.

The processes by the flooring system are—steeping, couching, flooring, withering, d. ying, curing, and storing.

Steeping is carried out in oblong troughs of iron, concrete, or brickwork. In these the barley is covered with a hard pure water, especially one containing sulphates and carbonates of lime, as these salts prevent the extraction of potassium phosphates, colouring matters, and nitrogenous

Analysis of two Samples of Malting Barley.

Constituents.	Percentage.	
	(1)	(2.)
Starch.	57.98	63.51
Nitrogenous matter	11.74	11.46
Water.	12.19	13.00
Cellulose.	10.51	7.28
Gums, sugars, pectins, colouring matters, etc.)	2.83	1.34
Fatty bodies . . .	2.17	1.03
Ash.	2.58	2.32
Total	100.00	100.00

the process. Barley is used in preference to other cereals for the following reasons: it germinates rapidly and readily; the growth of the acrospire (plumule)

bodies. English barley is usually steeped from sixty to seventy-two hours, while Smyrna and foreign varieties require rather longer. The object of steeping is to get rid of certain bitter bodies, and to allow of the absorption of enough water for germination. The grain increases in bulk from 100 to about 120 bushels, and by weight from 100 to 117 or 150 lbs. At the same time it loses inorganic and organic salts from 0.90 to 1.60 per cent.

After draining, the barley is thrown on to the couch to a depth of 11 to 14 in. It is stirred several times, to permit of an equal distribution of heat, moisture, and aeration. When little white protuberances show at the lower end of the corn, it is said to 'chit.' The couch is broken down, and the barley is spread evenly over a section of the malting floor, forming a 'piece.' The depth varies, according to circumstances, from 4 to 11 in. It is turned frequently during the growing, and, if necessary, sprinkled with water containing an antiseptic (bisulphite of lime), to prevent mould growth. In about nine to twelve days the rootlets and acrospire will have developed to the proper stage; the growing is then stopped by spreading the grain in thin layers over the floor.

Withering takes place as the moisture evaporates. The barley is now said to be 'green malt,' and is air-dried. Its moisture should not exceed 25 per cent.; the acrospire is grown nearly up; the rootlets are thick and bushy; the enzymes are developed, and the starch has been completely modified.

The green malt, transferred to the upper floor of the drying kiln, is spread out on the wire gauze or perforated tiles forming the bottom to a depth of from 4 to 7 in., and large volumes of dry air are passed through it. Dur-

ing the first day the temperature slowly rises to between 95° and 100° F., while the malt loses from 80 to 90 per cent. of its remaining moisture; on the second day, to between 110° and 125° F.; and on the third, to between 135° and 150° F. By this time all moisture has been evaporated. Turning is carried out, either by hand or by machinery, as often as is necessary.

Air is now shut off, and the temperature is raised to the maximum point for curing for from six to twelve hours. This maximum varies according to the class of malt required, and is very carefully regulated. A wise German once stated that beer is made on the kiln, and undoubtedly there is much truth in the statement. Pale malts are cured between 160° and 180° F.; high-cured malts vary from 185° to 210° F. Mr. Free, a well-known maltster, advocates curing at 200°, the results being good both as to the quantity and the quality of the extract.

Drying is necessary to expel moisture, to restrict the diastase and other enzymes, to arrest germination, and to check bacterial action. Curing renders malt friable, and gives it the proper aroma and flavour. After curing it is cooled, cleaned, graded, and stored—the latter to mellow it before it is sent on to the market.

Barley loses from 4 to 5 per cent. of starch in malting. The sugars in barley average 0.85 to 1.43 per cent.; in green malt, 4.6 to 5.1 per cent.; and in finished malt, from 11.8 to 15.2 per cent. Any considerable increase over these figures causes unsound beers.

The size of a flooring plant is as follows:—Steeping troughs, from 12 to 12½ cub. ft. per qr. of barley; couch, about 13½ cub. ft. per qr. of grain; floors, from 170 to 200 sq. ft. per qr. of barley; and kilns, from 20 to 25 sq. ft. per qr. of green malt.

Of pneumatic malting, the two more important systems are those of Galland and Saladin. Steeping is carried out in conical or rectangular troughs for shorter periods than in the flooring system—viz. from forty-eight to sixty hours. Couching, growing, and withering are secured, in the Galland-Hennings process, by huge iron cylinders, somewhat resembling a black-ash revolver, capable of containing 100 qrs. of barley. The time varies from ten to thirteen days, and the temperature from 50° to 68° F.; the latter usually increases with the increase in volume of air supplied.

Continental malts are, as a rule, harder and less friable than English ones. The periods of steep vary greatly, as also do the drying and curing temperatures. Thus, for many Munich beers a long steep and high-curing temperature are employed. According to Lintner, the browning of isomaltose—a malt sugar—begins at 185° F., and gives to these beers that pleasant, full, and sweet taste for which they have long been famous.

Brewing Processes.—The processes of the English infusion system are—crushing, mashing, sparging, boiling, cooling, fermenting, cleansing, racking, and storing. The raw materials are—malt, raw grain (as grits, flaked and torrefied maize, rice, and wheat), various brewing sugars (including glucoses, inverts, cane or sucrose, amyloins, malto-dextrins, saccharine, etc.), and water.

For all but mashing an ordinary pure water, such as is supplied by water companies or wells, is satisfactory; but for the production of worts water of special types is necessary. The great success of the Burton breweries is due in large measure to the saline water obtained from the marls and sandstones underlying that district; of the Dublin stout

breweries, to the calcareous waters of the Grand Canal or limestone springs around Dublin. For brewing, waters may be classed as soft and pure, calcareous, saline, and those of no special character. The first class requires the addition of suitable salts; gypsum, selenite, epsomite, sylvine, common salt, kainite, and calcium chloride are largely used for the purpose of 'burtonizing.'

Of soft waters, we may instance the water supply of Glasgow, Manchester, and Liverpool; of permanent hard waters, containing sulphates and chlorides of lime and magnesia, the Burton breweries' supply; and of temporary hard waters, containing carbonates of lime and magnesia in the form of bicarbonates which are precipitated by boiling, the waters around Dublin, in Derbyshire, London, Kent, Surrey, and Sussex. Waters containing alkaline compounds and nitrates are unsuited for mashing.

The malt is first weighed, and placed in a hopper which carries it into the malt rolls. Before crushing, pieces of iron, rootlets, string, and other rubbish, are removed. The crushed malt (grist) falls into the grist-case, where hardening materials, flaked malts, and similar grist-forming bodies are well stirred in; and from this grist-case the malt passes into the mash-tun, either directly, or through an external mashing machine, where it is thoroughly mixed with water of a suitable temperature.

The chief objects of mashing are, to gelatinize the starch and so obtain the wort or sugar solution, and to make use of the diastatic, proteolytic, and other enzymes of the malt. Two systems of mashing are in use—the infusion method in Britain, and that of decoction in other parts of the world. The limited decoction system is also used to some ex-

tent in the British Isles. A good idea of the infusion system can be obtained from the method of making porridge. In the older breweries mashing is effected by running a certain proportion of water at the proper temperature into the mash-tun—a metallic or wooden vessel fitted with rakes, false bottom, sparge, and other accessories—and stirring in the grist in a thin stream until the mash is complete. But modern breweries are fitted with an external masher, which is either power-driven or automatic. In

known also as amyloins, maltodextrins, or isomaltose, are less easily decomposed. For the most part they are fermented in the casks, thus bringing the beers into condition and made fit for consumption. Dextrins are generally unfermentable, but confer body and fullness on beers.

The above changes are very complex, and have not yet been studied satisfactorily. Considerable differences of opinion are prevalent. The changes depend on the types of malt and water, and on the temperature of both

Examples of Brewing Waters.

1. Saline, for Ales and Beers.		2. Calcareous, for Stouts and Porters.		3. Pure Drinking Water.	
Constituent.	Grains per Gall.	Constituent.	Grains per Gall.	Constituent.	Grains per Gall.
CaSO ₄	71.86	CaCO ₃	13.79	CaSO ₄	1.741
MgSO ₄	11.98	MgCO ₃	2.68	MgSO ₄	0.662
CaCO ₃	8.36	CaSO ₄	0.69	MgCl ₂	0.574
MgCO ₃	2.91	MgSO ₄	1.85	NaCl.....	0.478
Na ₂ SO ₄	3.34	CaCl ₂	0.79	SiO ₂ , Fe ₂ O ₃ , Al ₂ O ₃	} 0.139
NaCl.....	10.15	NaCl.....	6.47		
SiO ₂ , Fe ₂ O ₃ , Al ₂ O ₃	} 0.37	SiO ₂ , Fe ₂ O ₃ , Al ₂ O ₃	} 0.38		
	108.97		26.65		3.594

these the grist enters at the upper portion, meets with jets of water, and the mixture is carried forward into the mash-tun. Here the mash 'stands on' for about two hours, during which time chemical action takes place, resulting in the conversion of starch into maltose, intermediate carbohydrates, and dextrins by the agency of the diastatic enzymes, and of the nitrogenous matter by the proteolysts into yeast foods. Maltose readily breaks down on fermentation, yielding alcohol and carbon dioxide. Intermediate bodies,

at the time of mashing. The 'touching' or 'striking heats' vary between 150° and 167° F. The quantity of water to grist generally runs between 2 and 3½ barrels per quarter of malt. A thin mash gives, as a rule, more extract and a higher proportion of maltose than a thick one. Malts should yield from 80 to 95 brewers' lbs. per quarter of 336 lbs. Malt substitutes, such as flakes, are usually mixed with the crushed malt; but grits require a separate vessel, the converter, to gelatinize the starch:

the cooled contents of this are run down into the mash-tun. Sugars may either be dissolved by the worts as they run into the copper, or be mashed separately.

At the end of from two to two and a quarter hours all the starch will have become converted into wort sugars. The taps are then set, and sparging begins. The objects of sparging are, to wash out the extract from the grains, to control the temperature in the mash-tun, and to 'get up the copper lengths.' It is carried out by perforated revolving arms of such length as to cover the whole area of the tun. These send down on the grains a continuous shower of water of the right temperature.

In boiling malt, a brewing copper is used. This is a metallic vessel heated either by direct fire, or by internal steam coils, or by steam jacket. Some coppers are closed, others open. In all cases they should be of sufficient size to contain one-third more than the complete 'length' or volume of wort. The word length is used to denote the total volume of wort liquor obtained by mashing and sparging. A brewer boils his worts for the following reasons—to concentrate the wort, to sterilize it and prevent further enzyme action, to assist in the aeration, and to extract the hop constituents. Boiling must be thorough, otherwise unsound beers are certain to result.

We must now turn our attention to hops. Of this plant the female alone is cultivated, and the only portions of use to the brewer are the unfructified or fructified cones or strobiles. The cones, built up on a spindle, are composed of the bracts (bracteoles), on the lower portions of which grow the lupulin granules, or 'condition,' or hop-flour; and

the seed, a fruit about the size of a hemp seed, also covered with 'condition,' and contained in a kind of sac at the lower end of the bracts. When ripe, the lupulin granules are filled with a pale yellow-green coloured oil. According to Haberlandt, the cones consist of—

Lupulin granules, from	8.0	to	16	per cent.
Spindles	8.5	..	18	..
Bracts	70.0	..	80	..
Fruits	0.1	..	8	..

There are many varieties of hops, but the whole may be divided into three classes—reds, greens, and pale-greens. The reds exhibit a fine delicate aroma, and include the best Spalts, Saaz, and English Goldings and Jones. The greens are much coarser, and yield an aroma less pleasant than the reds. They include the hops grown in Belgium, Bohemia, America, the English Grapes and Cologates. The pale-greens are intermediate between the other two, and are not largely cultivated.

In a brewery, hops are used in the copper to give the wort its peculiar flavour and aroma, to precipitate certain nitrogenous compounds, to assist in clarification, to preserve the finished beers by the antiseptic properties of some of the hop constituents, and to act as a filtering medium for the wort. The quantity employed for the copper varies with the type of beer—from 4 lbs. for a running mild beer to 20 lbs. for a high-class pale ale per quarter of malt. In addition, they are used for the purpose of dry-hopping. Only the very best varieties can be employed, otherwise there is a serious risk of introducing infection into the beers. Choice Kents, Worcesters, Spalts, and Californians, from $\frac{1}{2}$ lb. to 2 lbs. per barrel are the usual quantities.

In choosing hops the following points should be considered: the

amount of lupulin granules; the balling together when rubbed, which is due to resins; general appearance and feel of the cones; freedom from mould; the delicacy of aroma; and the colour of both the hops and the flour.

From the copper the boiled wort passes into an iron vessel known as a hop-back, which is fitted with a false bottom of perforated gun-metal plates, and on these the hop cones settle down to form a filter-bed. In fifteen or twenty minutes the taps of the hop-back are opened, and the hot wort is allowed to spray into a shallow iron tank—the 'cooler.' This permits of aeration, and causes a much more vigorous fermentation; at the same time there is a deposit of hop and albuminous matter, spoken of as 'cooler sludge.' As soon as the temperature has fallen to between 130° and 140° F. the wort is passed over the refrigerator, and when cooled to the proper pitching temperature, is run into the fermenting vats or tuns.

There are three principal systems of fermentation in general use in the United Kingdom:—(1) Skimming, and its modification, the dropping system; (2) the Pontoon cleansing and Burton Unions system; (3) Yorkshire squares system.

For mild and running beers, especially those brewed for quick consumption, skimming is a useful and simple method. The wort being collected in the fermenting vats at from 58° to 62° F., is pitched with the proper quantity of yeast in the following way:—The yeast (barm) is well mixed with some wort at about 70°, then stirred into the main bulk of the wort. The yeast thus obtains a good start, and bacteria are not so likely to do mischief. The quantity of yeast varies with the system, and depends on the

specific gravity of the wort, the quality and quantity of the hops used, the type of wort (whether dextrinous or otherwise), the nature and amount of malt substitutes, the composition (type) of the water used for mashing, and the condition of the yeast. For running beers the quantity is from 1 to 1½ lbs. per barrel; for stronger and more heavily hopped worts, from 2 to 3½ lbs.

In about forty-eight hours after 'pitching' the temperature will have risen 6° or 8° F., and the attenuation, due to the formation of alcohol and disappearance of sugars, nitrogenous bodies, and mineral matter, should have reduced the specific gravity to one-half of its original figure.

The fermenting liquid is now skimmed to remove a dirty, frothy mass composed of hop resins, albuminous compounds, bacteria, and the like, which have come to the surface. When fermentation is about a third way through, skimming again takes place, the yeast removed being placed in yeast troughs for future use.

Rousing and skimming are continued until it is judged that the yeast is capable of throwing up one more head of sufficient thickness to shield the beer from the atmosphere and prevent the escape of carbon dioxide. Rousing is then discontinued, and the beer, which has now attenuated to nearly the required gravity, is allowed to remain quiet for a day or two to settle or cleanse. When complete, the last head (consisting, for the most part, of old or dead cells) is cleanly skimmed, and the beer is drawn off ('racked') into the trade casks. After standing for a short period, it is fined with a preparation of isinglass, sulphurous acid, and water, and sent out to the retailer.

In some breweries, where the dropping modification is in use,

the wort, while fermentation is at its height (from forty-eight to sixty hours after pitching), is dropped into a shallower vessel underneath. The object is to remove the carbon dioxide and ensure the aeration both of the fermenting liquid and of the yeast.

The cleansing system is one of the oldest in common use, and possesses certain distinct advantages: it yields a cleaner beer, and produces better yeast than can be obtained from the skimming system. In Burton, where the Burton Unions modification is employed, this system is seen in its perfection. The Yorkshire stone square system is confined chiefly to the north of England. Beers fermented in the squares are clean, drink very full for their gravity, undergo a good cask fermentation, and, as they retain much carbon dioxide, are full of life. The squares themselves are cumbersome and costly, and are difficult to keep clean. See FERMENTATION.

After racking off from the fermenting vats, the method of treatment varies with the class of beer. Running and cheap mild beers are sent out in a few days either with merely the addition of about a pint of strong sugar solution as a priming agent and a small quantity of isinglass solution as a fining agent, or after the addition of the finings alone. With lower-grade beers some kind of antiseptic is added in the trade casks, as well as the priming and fining solutions. Bitter beers and ales are generally racked into casks containing some of the very best hops, together with a priming solution. The casks are then placed in a cool cellar, and are rolled occasionally; and when the contents come into condition, finings are added, and the beers are sent out. For strong

beers, pale ales, and the best beers—all of which are brewed from the best materials, and hence are very stable—little more than ordinary cellar treatment is necessary.

There is a tendency at the present time to put on the market a cheap carbonated bottled beer. Generally such beers are produced from inferior materials by a limited decoction process of brewing; and after six or eight weeks' storage they are fined. The carbonating and bottling are carried out simultaneously. The flavour of these beers is very insipid and thin compared with the average Burton type of bottled beer, in fact, they appear to be deficient in most of the essential features of a beer fit for consumption—viz. an agreeable flavour and aroma, a palate fullness, foamy head, slight acidity, perfect clearness and brilliancy, and perhaps a certain sweetness.

Decoction Mashing is the system in common use in most countries outside the British Isles. Several modifications are adopted. That known as the 'three-mash' system is employed to the greatest extent; but there are also two-mash systems in daily use. The processes involve the following operations—mashing, clarifying, boiling with hops, cooling, fermenting, and storing.

In the three-mash system, the crushed malt and other grist materials are mixed with cold water by an external masher. The mixture falls into a mash-tun which is fitted with powerful rakes, and is connected with the mash-pan or copper: the latter contains chain rakes to keep the materials from burning on to the bottom. Rather more than half the required water is used at this stage. When all the grist is in the mash-tun, about a third of the remaining water, heated to the boiling-point, is slowly pumped into the mash,

the rakes going at full speed until the temperature is raised to about 95° F.—a very suitable point for the conversion of certain nitrogenous constituents into peptones and other yeast foods. About a third of this thick mash is run down into the mash-copper, the chain rakes are set going, and the contents are brought to the boil. This continues for approximately half an hour. The pump and the rakes of the mash-tun are now set on, and the boiled mash is pumped into the mash-tun until the temperature is raised to 127° F. A second quantity of mash is run down to the copper and treated as before. This action gelatinizes the starch and increases the extract. Again the mash is pumped back, and the temperature of the tun contents raised to about 149° F. Then a third portion of the mash, preferably composed of clear wort, is run into the copper, and boiled for fifteen to thirty minutes. It is pumped back into the mash-tun until the temperature is about 166° F. The whole of the mash is now pumped over into the clarifying tun—a vessel fitted with a false bottom, sparge, and less powerful rakes. The latter are run round to level the contents, and the whole is allowed to rest or 'stand on' for from fifteen to sixty minutes. The clear, bright wort is then run off into the ordinary copper to be boiled with hops. The grains or spent malt are thoroughly sparged with the remainder of the water, while the rakes of the tun are occasionally run round to stir up the grains and assist in getting out the extractive matter. The quantity of water required in this system is approximately twice the volume of the finished beer. The rest of the operations resemble those of the infusion system already described—viz. boiling with hops,

filtering, cooling, and pitching with yeast.

Fermentation of the worts so obtained is carried out in cold cellars (38° to 43° F.), either by the bottom yeast or by the vacuum system. In about twenty-five to thirty-five hours a thick white foam forms on the surface, and the actual fermentation begins. This comes to its maximum in six or seven days, and at the same time the temperature is also at its maximum—viz. from 45° to 50° F. After this the primary fermentation gradually slackens, while the temperature falls to 40° or 41° F.

The yeast, instead of working to the top as in English fermentation, settles to the bottom, and can be removed when the beer has been transferred to the lager or storage casks. The surface of the beer at the close of the vat fermentation presents an appearance not unlike that of a tiger's skin. This froth consists of hop resins and other matter of light gravity, which have been ejected from the wort. The lager casks are large, unwieldy vessels of oak, capable of containing from 40 to 75 barrels of beer. Internally they are coated with a special pitch; and a quantity of well-boiled beechwood chips is generally thrown in, to afford a means of attachment for the yeast. As a rule, several brews are distributed among a number of the casks, so as to ensure uniformity and colour. When the cask fermentation has well started, the bungs or shives are securely fixed, and the casks are placed in their positions in the lager cellar. As the cask fermentation only goes on slowly, the beers mature and come into condition gradually, and become quite brilliant. They are then racked off into the trade casks in the main cellar by machines which prevent the loss of carbon

dioxide and the access of air. The lager beer is now ready for consumption.

Just as there are many varieties of beers brewed by the English system, so there are a number of different types of beers obtained by varying the materials and processes of the decoction system. The more common are—the ordinary lager, bock beers, Pilsener, the dark and the so-called white beers. Usually each important brewery has a speciality of its own. See LICENCE AND LICENSING LAWS.

See Thausing's *Theory and Practice of the Preparation of Malt and the Fabrication of Beer* (1882); Dr. Sykes's *Principles and Practice of Brewing* (1897); Moritz and Morris's *Science of Brewing* (1891); Hansen's *Practical Studies in Fermentation* (1893); Lafar's *Technical Mycology* (trans. 1898); Reynolds Green's *Soluble Ferments* (1896); Dr. Effront's *Enzymes* (1902); Dr. Carl Oppenheimer's *Ferments and their Actions* (trans. 1901); *Transactions of Federated Institutes of Brewing*; Southby's *Practical Brewing* (1885); Wanklyn and Chapman's *Water Analysis* (5th ed. 1879); Baker's *The Brewing Industry* (1905).

Brewster, Sir David (1781-1868), Scottish natural philosopher, was born at Jedburgh. In 1802 he was appointed editor of the *Edinburgh Magazine*, and devoted himself to scientific studies and literary pursuits, especially to a series of experiments in optics. At the age of twenty-six he undertook the editorship of the *Edinburgh Encyclopedia*. In 1813 he published a *Treatise on New Philosophical Instruments*; and in the following year he commenced a series of papers contributed to the Royal Society on the *Polarization of Light*, for which he was awarded the Copley medal, afterwards receiving the

Rumford and Royal medals—the only other scientist to obtain the three medals being Faraday. In 1816 the Institute of France adjudged to him the half of the prize for physics of 3,000 francs, awarded for the two most important scientific discoveries which had been made in Europe during the two previous years; and in the same year he invented the kaleidoscope, which, though patented, obtained for him more fame than remuneration. He afterwards divided with Wheatstone the merit of introducing the stereoscope, by means of his lenticular instrument. Along with Professor Jameson he founded the *Edinburgh Philosophical Journal* in 1817, and afterwards the *Edinburgh Journal of Science*. His next work, *An Account of a New System of Illumination for Light-houses* (1827), the dioptric system, was not crowned with success till 1835, with the Inchkeith lighthouse. In 1831, in conjunction with Herschel, Babbage, and other kindred minds, he originated the British Association, and in the same year was knighted by William IV. He was appointed principal of the united colleges of St. Salvator and St. Leonard at St. Andrews in 1838, and in 1849 he was chosen president of the British Association. The last and crowning recognition of his celebrity was his election, in 1849, as one of the eight foreign associate members of the National Institute of France, on the death of Berzelius, the chemist. He became principal of the University of Edinburgh in 1859. Among his general works may be mentioned *Martyrs of Science* (1841), *More Worlds than One* (1854), *Life of Newton* (1828; new and fuller ed. 1855), and *Letters on Natural Magic* (1831). See *The Home Life of Sir David Brewster*, by his daughter, Mrs. Gordon (1869).

Brezova, Hungary. See ZOLYOM-BREZO.

Brialmont, HENRY ALEXIS (1821-1903), Belgian general and writer on fortification, was born at Venloo. Entering the army in 1843, he was in 1847 entrusted with the fortification of Diest. In 1859 he planned and (1860-70) constructed the strong entrenched camp at Antwerp. In 1877—two years after his appointment as inspector-general of Belgian fortifications—he, on the invitation of the Roumanian government, went to Bucharest to devise a system of fortification for that country; and in 1885 he made a second visit. The works, begun in 1886, were completed in 1899. Meanwhile Brialmont had finished plans for the fortification of the Belgian frontier along the Meuse, and the works are now (1905) mostly completed. In 1883 he submitted a plan for fortifications in Greece, at the request of the Greek government, and four years later retired from active service. Brialmont was a very prolific writer, amongst his more important books being *Histoire du Duc de Wellington* (1856-7); *Système de Défense de l'Angleterre* (1859); *Etudes sur la Fortification des Capitales et l'Investissement des Camps Retranchés* (1873); *La Fortification du Champ de Bataille* (1879); *La Fortification du Temps Présent* (1885), a capital book, forming a sort of résumé of his own works; *Influence du Tir plongeant et des Obus-Torpilles sur la Fortification* (1888).

Brian (926-1014), king of Ireland, known as Brian Boromha (Boru), or 'Brian of the tribute,' defeated the Danes at Sulcoit, near Tipperary (968), fighting under his brother Mathgamhain, who had possessed himself of the kingship. After his brother's murder (976), Brian seized the kingship, allied himself with Maelsechlainn or Malachy, chief king of Ireland,

defeated the Leinster men (984) and the Danes of Dublin, and finally seized Tara and subdued Maelsechlainn himself (1002). He then made a triumphal circuit of Ireland, receiving hostages from all the tribes. He was slain at the battle of Cluantarbh or Clontarf (April 23, 1014), where the power of the Danes, however, was effectually broken.

Briançon (anc. *Brigantium*), cap. dep. of Hautes-Alpes, France, 37 m. by rail N.E. of Gap, on r. bk. of the Durance. It is a fortress of the first class, and the most elevated town (alt. 4,330 ft.) in France. In 1815 Briançon withstood 'a three months' siege of the allies. There are silk and Briançon chalk industries, and coal is mined in the neighbourhood. Pop. 7,500.

Briand, ARISTIDE (1862), French statesman, was born at Nantes. He studied law, and in 1902 was elected to the Chamber of Deputies as a socialist by the miners of St. Etienne. He reported the Church and State Separation Bill, and in recognition of his tact and moderation was made, in 1906, minister of public instruction and worship. In 1908 he also became minister of justice. He succeeded Clémenceau as prime minister, July 1909, but resigned at the end of February 1911. It was largely owing to his efforts that the great railway strike in France in 1910 was peacefully terminated.

Briansk, or BRYANSK, tn., Orel gov., Russia, 75 m. by rail W.N.W. of Orel city, on the Desna, an affluent of the Dnieper. Arsenal (founded 1783), cannon foundry, shipbuilding yards (for river navigation); grain, salt, and wood trade. Cathedral of B.V.M., built 1526, and restored end of 17th century. Pop. 24,000.

Brianza, a highly-favoured dist. of Italy, called 'the Garden of Lombardy,' thickly dotted over

with the country seats of the Milanese, and celebrated by poets and painters alike. It lies between the two southern arms of the Lake of Como, and stretches from Bellagio southwards to Mariano.

Briare, tn., dep. Loiret, France, on r. bk. of Loire, 39 m. by rail S.E. of Orleans; gives its name to the first canal (connecting the Loire and Seine) made in France, begun 1604, finished 1642. Important manufactures of buttons. Pop. 5,200.

Briareus, or **ÆGEON**, son of Uranus and Gæa, a giant with a hundred hands and fifty heads who helped Zeus to conquer the Titans, and guarded them when imprisoned in Tartarus.

Briar-root is the name given to the roots and knots of the tree-heath *Erica arborea*, a plant belonging to the Ericaceæ; it abounds in countries bordering on the Mediterranean. Pipes made from these roots and knots are sold as briar pipes, the word briar being a corruption of the French *bruyère*, 'heath.'

Bribery. In Great Britain, the offer to or acceptance by a public official of a bribe is a common law misdemeanour. By the Sale of Offices Act, 1809, the sale of offices is a misdemeanour, and their advertisement for sale punishable by fine. By the Public Bodies Corrupt Practices Act, 1889, the giving or offering or promising of a bribe to any member, officer, or servant of a public body (such as a county or borough council or other local authority) in respect of any matter in which that body is concerned, and the soliciting and receiving of such a bribe, are statutory misdemeanours punishable at the suit of the attorney-general by imprisonment for two years, or fine not exceeding £500, or both, and by disqualification for public office for seven years,

or, in the case of a second offence, for life. Customs' and inland revenue officers receiving bribes are liable to a fine of £500, and disqualification for service under the crown; and persons offering bribes to such officers are liable to a fine of £500 (Customs Consolidation Act, 1876; Inland Revenue Regulation Act, 1890). As to bribery at elections, see ELECTIONS, and of jurymen, see EMBRACERY; also COMMISSIONS.

Brice, St., bishop of Tours (5th century). He was brought up in the monastery of St. Martin, near Tours, and succeeded St. Martin as bishop. His life was somewhat irregular. On his day, Nov. 13, 1002, by the orders of Ethelred the Unready, a great massacre of the Danes occurred, a treacherous act which cost Ethelred his throne.

Brickfielders, a hot wind of Australia, blowing from the north, is of the sirocco class. During November, December, and January it is very severe, the temperature at Sydney under its influence having been known to rise as high as 107° F. In Central Australia still higher readings have been registered, a shade temperature of 131° having been recorded; and at Melbourne apples have been said to be literally roasted on the trees.

Bricklaying. See BRICKWORK.

Brickmaking. The use of bricks dates from an early æge. The dwellings of the ancient Egyptians consisted chiefly of sun-dried bricks, remains of which may still be seen.

In England there are valuable brickfields—in Stafford, Essex, Kent, Northampton, and Suffolk. The first-mentioned county produces a blue variety; from the last we get the 'Suffolk whites.' In Scotland, Whitehill and Newhailes produce good red stocks, and the Wishaw fire-brick is quite equal to those from Wales and Stourbridge.

A good clay ought to contain about 20 per cent. of alumina, 60 per cent. of silica, and 20 per cent. of other salts, such as iron, lime, and manganese. When alumina is in excess there will be considerable shrinkage in the burning, and the bricks may crack; a sandy clay produces porous and brittle bricks. The colour depends partly on the amount of iron present, and partly on the temperature during the burning. On the London brickfields chalk is mixed with the clay, producing a material similar to 'malm,' a bright yellow brick earth now scarce.

The earth is dug in autumn, and allowed to weather till spring. After being moistened and well worked ('tempered') with a spade, it is then carried to the pug-mill. Here it is further worked and mixed by an arrangement of knives, ultimately coming out in a solid mass. This, in the case of hand-made bricks, is cut in pieces and passed along to the moulder, who packs it well into the mould, a case of hardwood or metal, open at the top and bottom, and slightly larger than the finished brick, to allow for shrinkage in burning. To remove the surplus clay, a straight-edge, called the 'strike,' is passed across the top of the mould. Each time the mould is filled, it, as well as the table on which it rests, must be sprinkled with sand or with water: the former is called 'sand-moulding,' the latter 'slop-moulding.'

The moulded green bricks are now stacked on the hacks to dry, and are generally built eight courses high, and so arranged that the air has free access all round them. This takes from six to eight days, after which the bricks are ready for the fire. They are burned in one of two ways--by clapp or by kiln. In the first method the bricks are stacked to

form a clapp on the highest part of the field, and so arranged as to give the walls a considerable batter. Layers of cinders ('breeze'), from one to two inches in depth, are placed between the courses, spaces being left for the kindling material--generally coal, breeze, and wood--while flues are carried through the mass. In order to keep in the heat and regulate it, the clapp is plastered over with clay; and when the fire is burning briskly, the furnace holes are similarly closed. After from twenty to forty days, depending on the number of the flues, the clapp is 'drawn'--i.e. the mass is broken open, and the finished bricks removed. In the second method some form of built kiln is employed. These structures are various in design, the Hoffman being one of the best. It consists of a series of chambers, so built that in some the full heat from the furnace is obtained, while in others the waste gases afford sufficient heat to dry the freshly-moulded bricks. The fuel, consisting of small coal, is fed in at the top. Most modern kilns, though not of the exact Hoffman type, are designed on the same principle.

The Scotch kiln is a common type--brick built, rectangular on plane, and open at the top. The Suffolk or Sussex kilns are varieties of this.

The ordinary kiln is a conical brick structure, in which the damp bricks are first dried by a gentle heat; the furnace is then fully charged, and, when thoroughly alight, its mouth is plugged with a mass of clay and broken bricks. During the burning the temperature is not kept constant, but is successively raised and lowered. After about forty-eight hours the bricks are ready, and may be then sorted into 'stocks,' 'burrs,' or 'clinkers,' and 'place bricks;' these terms are applied respect-

ively to well and evenly fired, overburnt, and underburnt bricks.

There are two classes of machines by which bricks may be moulded. In one the pressure employed is moderate, and the clay is worked wet; in the other the pressure is greater, and the clay supplied is dry and powdered. In the wet-process machine the arrangement is such that the clay, after being well mixed, is forced out between rollers and through a die in a compact stream of the desired dimensions. By means of wires the mass is cut up into separate bricks. In the dry-process machine the clay is fed into the pug-mill from a mixer, and forced by the knife-blades into moulds on a revolving table. As this table revolves, the bricks are forced up, and then slid under a steam-heated press. After pressing, the bricks are ready for the kiln.

Bricks made from brick earths or clay with the admixture of other substances are moulded to the required shape, dried, and burnt either in kilns or clamps. They are described as 'hand made,' 'machine made,' 'clamp burnt,' or 'kiln burnt,' according to the methods employed in making them. 'Pressed bricks' and 'wire cuts' are names given to bricks made by special machines, in which the bricks are pressed or cut off to length by stretched wires respectively. 'Salt-glazed bricks' are those which have a thin glass-like glaze on the exposed surfaces, formed by throwing salt on them whilst being burnt in the kiln. 'Enamelled bricks' have a china-like surface of various tints by dipping the partly-burnt brick into a specially-prepared 'slip' and reburning them. The size of bricks is not uniform, although the general building brick is approximately 8½ in. long, 4½ in. wide, and 2½ in. thick.

The manufacture of stoneware pipes differs from the above in respect to the mould employed. Like bricks, they may be worked by hand or by machinery. In the former case the clay is beaten out flat to the required size and thickness, then well wetted, and wrapped round a cylinder, its edges being well pressed together. In pipe-moulding machinery the clay is forced through an annular space of the required dimensions. After moulding, the pipes are gently dried, and then burned in special kilns. See also POTTERY.

Brickwork. The art of brickwork may be divided into two great classes: (1) bricklaying; (2) brickcutting. In building, the work of the bricklayer is chiefly confined to the former, which provides for the arrangement of bricks in such a manner as to secure the maximum strength. This is termed the bonding of bricks, of which there are several methods, varying with circumstances. The average size of the general building brick used in and about London is 8½ in. long by 4½ in. wide by 2½ in. thick, though in the north of England they are slightly larger. The long face of the brick is known as a 'stretcher,' and the end as a 'header.'

Bonds in brickwork. — The chief of these is 'English bond,' which consists of alternate courses of headers and stretchers. This is generally considered the strongest of all the bonds. 'Flemish bond' consists of alternate headers and stretchers in the same course, and is sometimes preferred to English bond on account of (1) the appearance, (2) the fact that any want of uniformity in the proportion between the headers and stretchers is equalized. 'Single Flemish bond' consists of English bond backing with a facing of Flemish

bond. 'Sussex' or 'garden wall bond' is a bond used principally for 9-in. walls, and admits of keeping a 'fair' or regular face on both sides of the wall, hence the name garden wall bond. The bricks are laid to show three stretchers and a header alternately on the same course. 'English garden wall bond' is used for the same purpose as the above, and consists of three courses of stretchers and one of headers alternately. 'Diagonal bond' and 'herring-bone bond' are used in thick walls to act as a tie and increase the strength. In the former the bricks in the heart of the wall are laid at an angle of 45° with the face. In the latter the bricks, again in the heart of the wall, are laid at an angle of 45° with a centre line, but in opposite directions.

Hollow or cavity walls are used in exposed positions, or where the outer face of the wall is in contact with damp earth. Usually a half-brick or 4½-in. wall is built on the outside, then, leaving a space of 2½ in. or 3 in., the inner wall is built, which may be 9 in., 13½ in., etc., according to the height. The two walls are tied together at intervals by bonding bricks, or bonding ties of wrought iron. In good construction it is essential that such cavities should be ventilated.

In ordinary bricklaying the 'footings' (i.e. the base of the wall) having been put in, the 'quoins' or corners are first built up for a few courses perfectly 'plumb' and 'square,' the work usually rising four courses to the foot. A line is stretched across the intermediate space, level with the top of each course, and to this line the bricks of the face work are laid, the inside work or 'backing in' being done by a less skilled operator. In thick walls, such as retaining or embankment walls, the inside bricks are some-

times laid dry, and a thin mortar spread over each course so as to run between the joints. This is known as 'grouting' or 'larrying.' The joints of the face brickwork may be struck off as the work proceeds, or raked out and filled in with a specially-prepared stopping. This operation is known as 'pointing,' and is frequently employed to renovate old brickwork. Whichever method is employed, the best joint is known as the 'weathered joint,' in which the mortar is struck by means of the trowel so as to form a surface sloping outwards from the top of joint. The mortar used is known as cement mortar or lime mortar, according to whether Portland cement or lime is mixed with the sand. For ordinary work above ground proportions may be one part lime, three parts sand; for work in damp situations and below ground, one part Portland cement to five parts sand.

Brickwork is generally measured by the rod of reduced work. A rod = 272 superficial feet, and reduced work is brickwork 1½ bricks thick. All work is brought to this common thickness.

Gauged brickwork is a variety of brickwork in which special bricks are used, known as 'rubbers' or 'cutters.' Such bricks are very soft and uniform, one of the best-known varieties being the T.L.B. rubber. The joints in this kind of brickwork are exceedingly thin, usually about ½ in. The work being set out, the bricks are rubbed perfectly square on a circular bed of stone, and afterwards reduced—i.e. cut to size in a wooden box by means of a wire bow-saw. The use of this type of brickwork seems to have been introduced by Sir Christopher Wren in the 17th cent.

Brick arches are divided into three classes:—(1) Rough, in which the bricks are not cut to

shape, the joints radiating according to the curve of the arch; (2) axed arches, in which the bricks are approximately cut to a radial shape by means of a tool known as the 'scotch' or 'scutch'; (3) gauged arches, in which special bricks described above are used, and cut exactly to the required size and shape of specially-prepared templates fixed in wooden boxes. See Richards's *Bricklaying and Brickcutting* (1901); Hammond's *Practical Bricklaying* (1903); and Mitchell's *Brickwork and Masonry* (1908).

Bride, BRIDEGROOM, and BRIDAL. See MARRIAGE.

Bride, St. See BRIGIT, St.

Bridel, PHILIPPE CYRIAQUE (1757-1845), Swiss Protestant pastor, elected (1786) pastor of the French church at Basel, in 1796 was called to the cure of Château d'Oex, and in 1805 to that of Montreux. He set himself to stir up the patriotism of the French-speaking Swiss for the Confederation. His *Étrennes Helvétiques* appeared annually from 1782 to 1816, and from 1816 to 1831 bore the name of the *Conservateur Suisse* (best ed. 1855-8). It treats of all subjects relating to Switzerland, and is much valued. His *Course de Bâle à Bienne par les Vallées du Jura* appeared in 1789 (enlarged ed. in 1802), and his *Histoire du Comte de Gruyère* in 1838, but his *Glossaire du Patois de la Suisse Romande* not till 1866. See *Life* by Vulliemin (1855).

Bridewell, par., City of London, Middlesex, England; once contained a famous prison or house of correction, so named from St. Bride's Well, a spring of reputed healing power. It was burned during the great fire of 1666, and was finally demolished in 1868. The name has now become a general term for establishments of a similar nature.

Bridge. At a remote period of antiquity the Chinese crossed openings or spans of great width by means of suspension bridges. In Europe, the Romans were the greatest of ancient bridge builders. The invention of the masonry arch has usually been attributed to them; and though traces of an arched construction are occasionally found in earlier architecture, yet the Romans were the first to employ it upon a bold scale for the construction of great bridges and aqueducts.

Until the 19th century a bridge was generally understood to be a structure for carrying a road across a river; but now that roads, railways, and canals are laid out upon lines which cross over and under each other, any structure which carries these lines of communication may be considered as a bridge, although it would sometimes be otherwise designated. The words 'aqueduct' and 'viaduct' are often applied to special forms of bridge, but they define only the nature of the *carried* line of communication. The viaduct is a structure carrying a line of way, which may be either a road, railway, or footway; and such a structure would be called a bridge if it were built over a road, railway, river, or arm of the sea.

A bridge crosses one or more 'spans,' and the structure must include two or more supports, with some kind of superstructure built over the intervening openings. For a single span the supports consist of a pair of abutments, whose form will depend on the superstructure; but whether they receive the abutting thrust of an arch or the dead-weight of a girder, they are commonly called by the same name. For a bridge of several consecutive spans, the intermediate supports are called the piers. The flooring is so arranged as to consti-

tute a platform adapted to the character of the traffic carried over it, and forms a subsidiary part of the superstructure; but the main superstructure is that which carries the distributed weight of the floor and its load, transferring it to the supports on either side.

Bridges are designated according to the character of the main superstructure, whose design in modern examples exhibits great variety. They may, however, all be classed under three principal types—the beam, the suspension bridge, and the arch, which, in their turn, have been dictated by the physical properties of three classes of building material.

1. The transverse stiffness exhibited by every piece of timber suggests its employment in the form of a beam laid horizontally across an opening. Iron girders are modifications of the beam, fulfilling the same functions.

2. A flexible rope or chain possesses no transverse stiffness, but offers a high resistance to a direct pull or tensile stress. The rope can easily be hauled across an opening too wide to be spanned by a piece of timber; and when the ends are made fast, the rope is capable of carrying a suspended load, as in Fig. 1, or several loads, as in Fig. 2, or the weight of a continuous floor, as in Fig. 3. With each new distribution of the load the rope will find for itself a new position of equilibrium, falling into a certain curve or polygonal line, the so-called 'funicular polygon.' The study of this figure is a branch of graphic statics; it serves to illustrate the principles concerned in the equilibrium of arches and in the construction of girders, as well as the actual form of an equilibrated chain. When the load is *uniformly* distributed along the floor, as in Fig. 3, the figure becomes a parabolic curve. It is a cate-

nary when the rope or chain (of uniform section) has nothing but its own weight to carry. If the funicular polygon is inverted, it becomes a 'linear arch,' or a line of struts equilibrated under the given load. The 'line of tension' in the curved chain becomes a curved line of pressure in the arch.

3. A mass of brickwork or masonry held together by mortar joints possesses neither the transverse strength of the beam nor the tensile strength of the rope, but is well adapted for sustaining a direct pressure. It can be used in the straight vortical piers of a tall viaduct, transmitting the line of pressure from summit to base; but if such a material is employed for the superstructure, it can only be in the form of an arch. When the arch is carefully designed on the curve indicated by the flexible chain, the line of pressure will be transmitted through it without subjecting the masonry to any bending or tearing stress. Thus, an arch of uniform section, if it has nothing to carry but its own weight, should be built in the form of an inverted catenary; while a parabolic arch would be exactly suited for carrying a load which is uniformly distributed along the horizontal floor. Usually the load is not quite uniform, and the line of pressure often approximates to a short arc of a circle. The principle is applicable to arched ribs of iron and steel, while in masonry structures it governs the design of the 'free arch,' or that portion of the arch which maintains its equilibrium under vertical forces, like the free chain of the suspension bridge in Fig. 3.

Masonry arches.—The outline of a segmental arch is shown in Fig. 4, its figure being the segment of a circle. The arch springs from the abutments A and B, and at the 'springing' it rests upon the 'skewbacks,' which are special

courses of stonework dressed back to the proper inclination. At the crown C the arch rises above the chord line to a certain height CD , which is called the 'riso' of the arch; it is measured from the chord to the soffit. The 'extrados' and 'intrados' are the external and internal surfaces, or the lines which define them; and the soffit is the under side of the arch. The constituent stones of the arch are termed 'voussoirs'; they are dressed to a tapered form, the beds being plane radial surfaces.

A small segmental arch may sometimes be built as a free arch from A to B ; but if the span is a large one, the masonry of each abutment is generally carried up above the skewback, so as to enclose the lower portion in masonry backing.

The reaction of the backing, in a horizontal or in a normal direction upon the arch, is essential to its stability whenever the elliptical or the semicircular form is adopted; for it is impossible that the line of pressure can follow either of these curves if the arch receives only the action of parallel vertical forces or loads. The elliptical arch has been chosen for many large river-bridges, such as those crossing the Thames; and the usual disposition of the backing is sufficiently illustrated in Fig. 5. It encloses the arch up to certain points E and F , so that the free arch is only the intervening length EF .

The Romans invariably adopted the semicircular form, carrying the backing always to the requisite height. The pointed arch was used by the Gothic architects as an aperture in a masonry wall; it is not suitable for bridge construction.

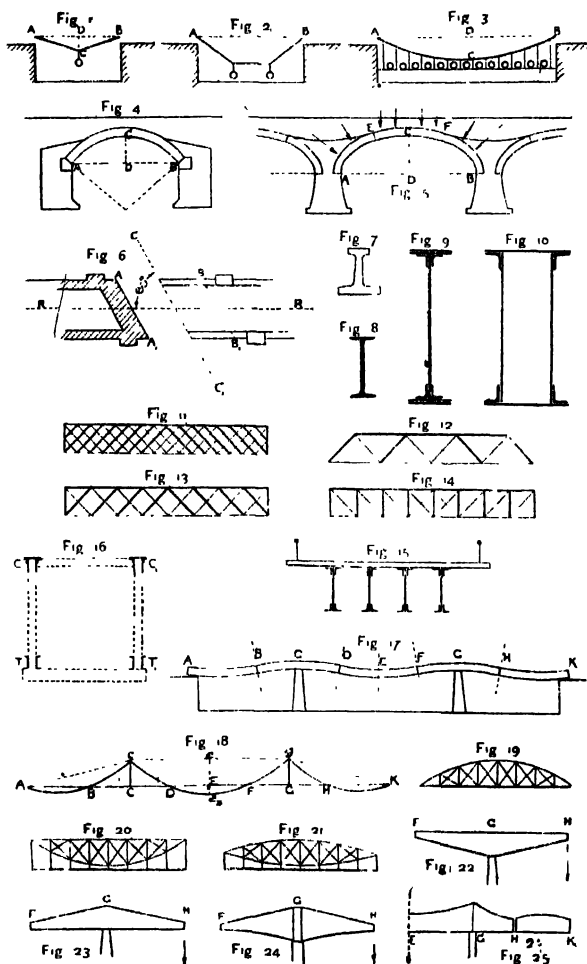
Oblique arches are often employed where the carried line of communication crosses obliquely over a lower one, as sketched in

the ground plan of Fig. 6, where the line RR crosses over the line CC at an angle of about 60° , so that the 'angle of skew' is then $30^\circ = 90^\circ - 60^\circ$. The arch crosses from the abutment AA_1 to the abutment BB_1 , and is generally cylindrical in form; so that a section at right angles to CC_1 would be either a semicircle or a segment, while the face AB , or A_1B_1 , would be elliptical. The arch is generally built in spiral courses, so that each course of voussoirs winds over the cylindrical intrados like the twisting bands and grooves of rifled ordnance. In this way the beds can be placed nearly at right angles to the line of pressure; and they are not plane but helical surfaces.

Brick arches are occasionally, but not usually, built with tapering voussoirs. In using the ordinary bricks, they are laid in concentric rings, with the object of ensuring a nearly uniform distribution of the pressure, and avoiding the occurrence of widely-tapering mortar joints. Thus, an arch eighteen inches in thickness would consist of four such concentric rings, one over the other, and the joints would be equally fine in each ring.

Concrete arches have been often used in modern times, and frequently with the object of dispensing with the employment of skilled labour. The liquid Portland cement concrete is filled behind or between temporary moulds, and becomes a monolithic mass on the setting of the cement. In 1902 a bridge was built at Sutton Drain, Hull, consisting of concrete poured over a frame of steel bars.

The *inverted arch* is employed in engineering construction wherever the conditions are the opposite of those presented in the upright arch. It usually forms the floor of tunnels, culverts, graving docks, and lock entrances. In



Bridges.

Diagrams referred to by numbers in the text.

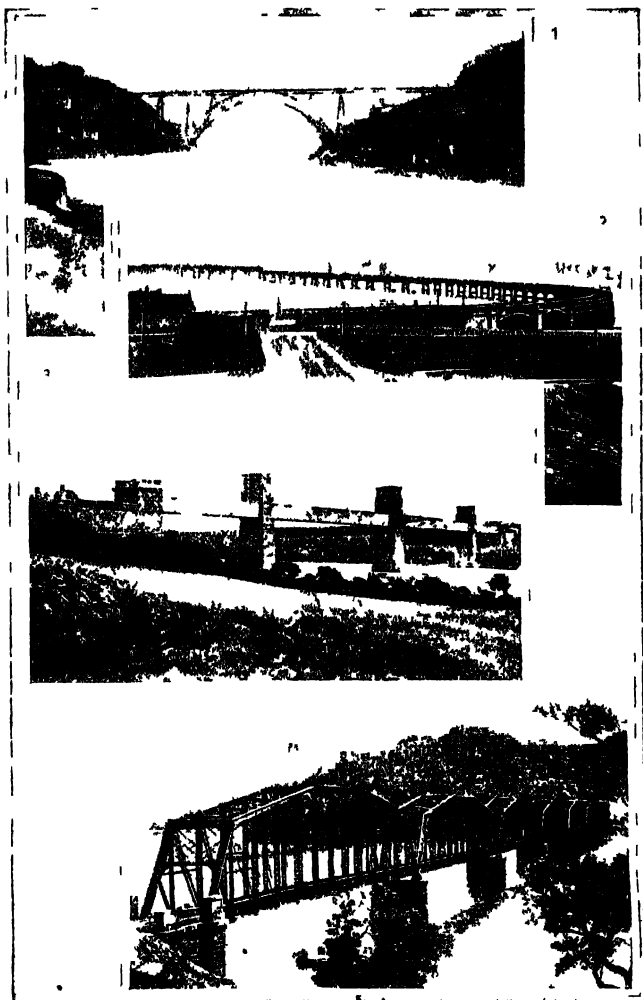
either of these situations it serves as a strut between the side-walls, and it also distributes the weight of the side-walls over the whole area of the floor.

Girder bridges differ from arches and suspension bridges in the character of the forces which are transmitted by the superstructure to the supports. The thrust of the arch and the pull of the suspension-chain have to be resisted by heavy and strong abutments; but the main girders, which form the superstructure of a girder bridge, act like beams, transmitting to the supports nothing but *vertical* forces or loads. The internal stresses are also different. In a loaded beam, supported at each end, the material undergoes three different kinds of stress. The direct compressive and tensile stresses, which act longitudinally in the upper and the lower fibres of the beam, exhibit their effect in the visible shortening and lengthening of the fibres, and the consequent bending of the beam; while certain 'shearing forces' also come into action throughout the solid section of the beam.

The modern girder is designed to provide separately, and in the most effective manner, for the necessary resistance to these three kinds of internal stress. Hence a girder will generally consist of three essential members—an 'upper flange,' a 'lower flange,' and an intervening 'web.' When the loaded girder is supported at each end, the upper flange resists the direct compressive stress, the lower flange acts as a tie in direct tension, while the business of the web is to transmit the shearing force. Each of the constituent members, however, has received different names according to the various structural forms that have been chosen for it, while the essential functions have remained the same. The earliest girders

were made of cast iron, and took the form sketched in the cross-section of Fig. 7, the lower flange being much wider than the upper, because the strength of that material is so much less in tension than in compression. In wrought iron or steel there is no such great inequality of strength, and the two members are generally designed with approximately the same area. Thus small steel girders are often rolled in one piece, with such a section as that shown in Fig. 8, where the upper and lower members have equal areas. Rolled beams of this form are used for the subsidiary parts of bridge flooring; but for main girders of moderate span the section is built up of separate plates and angle bars, as illustrated in Fig. 9. These are called *plate girders*, and they frequently are built with a double web, as in Fig. 10, where the section becomes a hollow rectangle or box section. The great tubular girders of the Britannia Bridge across the Menai Strait are hollow girders of rectangular box section, carrying the railway inside the box. The flat roof and floor are built in cellular form, and constitute the two principal members, while the plate side-walls form the double web. But when the bridge is subjected to a violent side-wind, the plate walls assume the function of flanges, while the roof and floor become the double web of the wind-girders.

Lattice or braced girders.—It is not necessary that the web should be a continuous sheet of metal; and if the space between the two flanges is filled with a lattice of crossing bars, as in Fig. 11, the essential functions of the web will be performed equally well. The web-stresses are then resolved into direct pulls and thrusts passing in a zigzag direction towards the abut-



Girder Bridges.—I

- 1 Railway Bridge Oporto 2 Tay Bridge 3 Britannia Tubular Bridge
4 Railway Bridge Hawkesbury, N S W

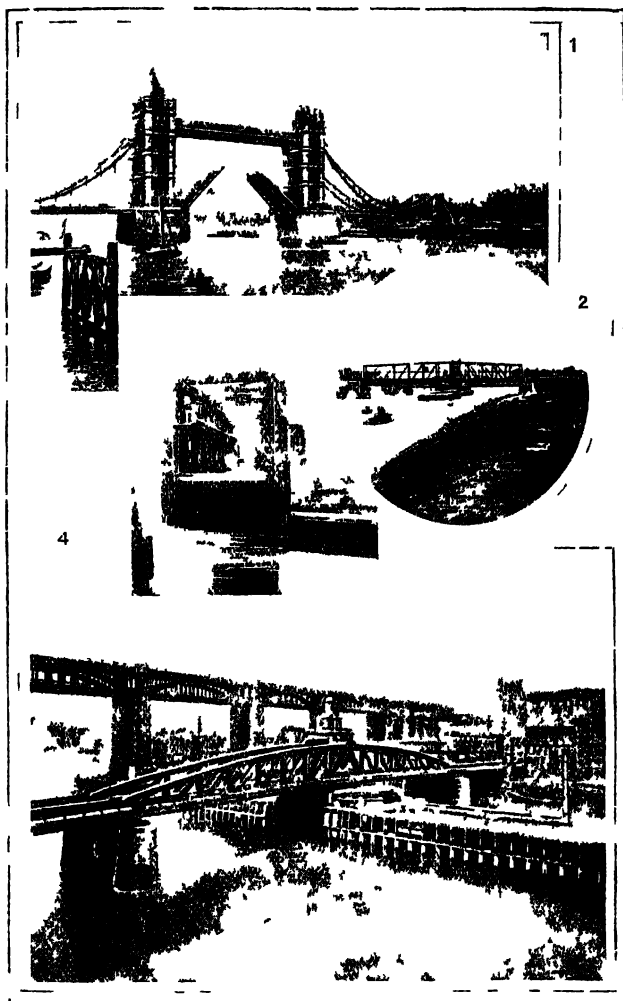
ments, so that some of the bars are struts and others act as ties. (The struts are distinguished by thicker lines in the diagram.) This is a more effective disposition of the material in a web which covers a large and deep area, and in modern practice the plate web is used only for small spans. A still more effective construction for large bridges is obtained by leaving out some of the lattice bars, and thereby concentrating the stress upon a smaller number of members. Thus, the close lattice may be reduced to the open lattice of Fig. 13, or to a single triangulated system of bracing, as in Figs. 12 and 14; and in either case the web system may consist of inclined struts and ties, or of vertical struts and inclined ties, as in Fig. 14. The girder thus becomes an assemblage of separate bars acting either in direct tension or compression, and the two principal members are often called 'booms' instead of flanges. In America they are designated 'chords.'

Girder bridges are distinguished as 'deck bridges' or 'through bridges,' according to the position which the floor occupies in the superstructure. Fig. 15 is the cross-section of a deck bridge, in which the floor or deck is carried upon the top of four main girders; while in the larger bridge of Fig. 16 the traffic goes 'through' the bridge, as it does in the Britannia rectangular tubes. The through bridge consists of the two main girders, in which C and T are the principal members of one girder, and C_1 and T_1 of the other; the vertical planes CT and C_1T_1 are occupied by the bracing of the web system; the floor TT_1 is carried by cross girders braced together by diagonals like a horizontal web; while the horizontal plane CC_1 is filled in like manner by an overhead system of wind-bracing. The two planes of horizontal bracing

form the double web of the wind-girder.

A *cantilever* is a girder which projects beyond its support, and carries a load upon the projecting arm. It may have to carry a load distributed along the arm, or a concentrated weight at the outer end, and in cantilever bridges it generally carries both. The bending stress in the cantilever is the reverse of that which takes effect in a beam supported at the ends, and the cantilever is therefore bent in the reverse direction, with a curvature convex upwards, like a fishing rod.

A *continuous girder* is one that crosses two or more spans in one continuous length, the girder being laid upon three or more supports. Such a girder bends in both directions, as illustrated in a very exaggerated manner in Fig. 17, where the beam AK is laid upon four supports at A , C , G , and K . The portions BCD and FGH are bent like cantilevers, while the portions AB , DE , and HK lie in a sagging curve, like beams supported at their ends. The points B , D , F , and H , where one kind of bending ends and the other begins, are called the 'points of contrary flexure.' Their exact position in a continuous beam can be determined beforehand, though only by a mathematical investigation of much complexity; but when they have been located, it becomes easy to trace the internal stresses in all parts of the structure. The length DE undergoes all the stresses and also performs all the functions of the girder supported at each end, transferring its load to the points D and F , where it is carried upon the projecting ends of the cantilevers CD and GF . And this defines exactly the load which the cantilevers have to carry at their extreme ends, while they also bear the loads which may be distributed along their own length. At the points D and F there is no bending



(Water Bridges. -II)

1 Tower Bridge London. 2 o Barton aqueduct carrying Bridgewater Canal over Manchester Ship Canal. (Photos by E Ward Manchester) 4 Newcastle Harbour Bridge and Swing Bridge. (Photo by G W Wilson & Co)

stress, and the load would be just as safely carried if the girder were hinged at these points.

Cantilever bridges are built upon the principle which has just been indicated. The points of contrary flexure are not left to find their places in accordance with the laws of elastic deflection, as they do in the continuous beam, but they are located at a pair of definite points (such as D and F) by the mechanical expedient of hinging the girder at these points; and the points chosen for this purpose can be located at any desired distances from the centre E, so that the supported span DF can be made of any length less than the total span CG. This method of construction offers many advantages for the bridging of very wide openings, and it received its first and greatest application in the girders of the Forth Bridge. The early bridge builders of China and Japan had indeed learned that a beam of timber forty feet long might be used to cross a fifty-foot opening by laying it upon projecting corbels; but the considerations that have guided the modern engineer in the design of steel cantilever bridges are of a totally different character. In recent times the hinged girder, or cantilever, has frequently been employed in large bridges of *three spans*, for which, indeed, it is specially well adapted; and the design of such bridges has followed two different types. The first of these is illustrated in the Niagara and the St. John River (New Brunswick) bridges, where the central detached girder DF (Fig. 17) is carried between the two overhanging ends of the rigid girders AD and KF, so that the structure is virtually hinged at the two points D and F; while the alternative plan locates the hinges at B and H, so that the structure then consists of a rigid girder BH projecting at each end beyond the

supports C and G, and carrying the detached girders AB and HK, whose outer ends rest upon the abutments. This latter type of construction is exemplified in the Kentucky Bridge, and also in the great bridge recently erected across the Danube at Cernavoda, in Roumania. In either of these types the bending stress at the centre of the great span CG is very much less than it would be in a simple independent girder; the structure itself is therefore lighter, and the problem of bridging a very wide span is thus made easier by the use of the cantilever. These points are clearly illustrated by reference to the stresses in girders of uniform depth.

Girders of uniform depth constitute a particular class which is marked by certain characteristics besides those of mere form. The two principal members are, of course, a pair of horizontal booms or chords, as in the independent girders of Figs. 11 to 14, or in the continuous girder of Fig. 17; and the two booms are united by some kind of lattice bracing or plate web. In all such girders the booms have to resist a direct force or stress which is never uniform throughout the span, but much greater at some points than at others. If the girder is merely supported at each end, without being strained over the supports, the boom stress will depend upon the distribution of the load, and will be represented in the simplest manner by the form of the 'funicular polygon,' so that a flexible rope carrying a similar load might be used as an instrument by which the stress diagram is automatically described.

At the beginning of this article it was remarked that the rope falls into a different shape with each new distribution of the load; but in each case it describes the 'stress diagram' for the booms of the girder. When the rope carries

nothing but a single weight in the centre of the span, it is pulled into lines which form the sides of the triangle ABC in Fig. 1, and the height of that triangle is everywhere a measure of the boom-stress in a girder carrying the same central load. At the centre the boom-stress is represented by the height DC , and from this point the stress dies away regularly in each direction until it vanishes at each end of the span. Again, the varying magnitude of the boom-stress will follow a different law when the load is uniformly distributed along the girder. Under such a load it was observed that the flexible rope falls into the parabolic curve ABC of Fig. 3; and the height of that figure, measured from the chord line, will everywhere represent the varying stress in the booms of the girder—a compressive stress in the upper, and a tensile stress in the lower boom. In the same way, for any other disposition of loads between the supports, the funicular polygon becomes the stress diagram; and the stress vanishes at the points of support, where the polygonal line joins the chord.

The same method might be applied to the span CG in Fig. 17, if the girder were subject to no other forces outside the span. For any given loading between the points C and G , the curve ce_2g in Fig. 18, representing the funicular polygon for that load, would serve as before to measure the boom-stress. At the centre of the span the booms would have to be made strong enough to bear the great stress ce_2 , while the stress would die away to nothing at the points C and G . But the conditions are greatly altered when the girder is made to project beyond the supports C and G , and to carry any load upon the projecting ends B and H outside the span. The effect of such extraneous loading is felt not only upon the projecting arms,

but throughout the length CG , reducing, annulling, or reversing the stresses that have been previously described. The stress diagram will therefore be greatly changed when the span CG forms one of the openings in a continuous girder bridge. The curve ce_2g will remain unaltered; but if D and F are the points of contrary flexure, the base line of the diagram will be the straight line $CDFG$ in Fig. 18, instead of the straight line cg , the new line being drawn through the points D and F upon the curve. At the centre of the span the compressive stress in the upper boom will now be measured by the comparatively small height De_2 , dying away to nothing at D and F , where the boom suffers no stress of either kind. From D to C the stress will be reversed in character, and the tensile stress in the upper boom will reach its greatest magnitude Cc at the point of support. In cantilever bridges of either class, the diagram of bending stress will have the general form indicated in Fig. 18, consisting of a curved line, such as ce_2g , intersected by a straight base line. The form of the curve depends only upon the distribution of the load; while the base line may lie at different levels, its position depending upon the points D and F , which are fixed by the arbitrary location of the hinges.

Girders of varying depth.—If the depth of the girder is increased at any point, the boom-stress at that point will be proportionately reduced; and the stress diagrams for girders of uniform depth serve to indicate the points where an increased depth is desirable, and to indicate other points where the stress is very small, and where the depth might profitably be reduced. Thus, each of the diagrams which have been traced for girders of uniform depth suggests an altered form of girder, in which the depth shall vary, while the boom-stress

shall either be uniform or approximately uniform; and, with this object, the diagram itself may be taken as a model for the design. Girders that are supported at each end may be built to either of the polygonal or parabolic outlines sketched in Figs. 1 to 3; and if the load were wholly concentrated at one central point, the triangular form suggested by Fig. 1 would be eminently suitable. If the triangle were turned upside down, the required variations of depth would still be preserved, and the figure would represent in outline the 'King post truss'—familiar in timber construction. In general the load is disposed in a manner which approximates more nearly to the uniform distribution assumed in Fig. 3; and for such a load the girder of varying depth may take the parabolic form of the bowstring girder, as in Fig. 19, or the inverted bowstring, as in Fig. 20; or both the members may be curved, as in Fig. 21, which represents the outline of the Saltash bow-and-chain bridge. In each case the lower member is a tie or chain subjected to a nearly uniform pull throughout, while the upper member is either a straight horizontal strut or an arched compression member under nearly uniform stress.

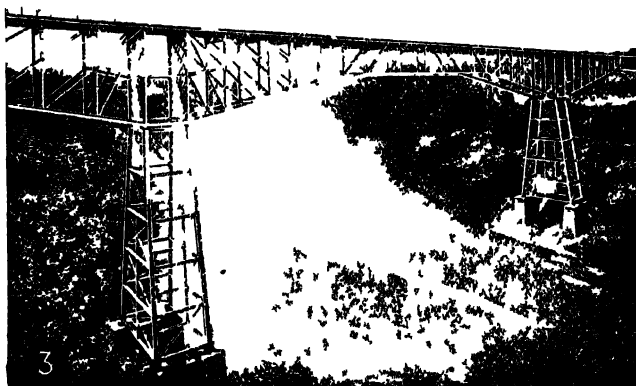
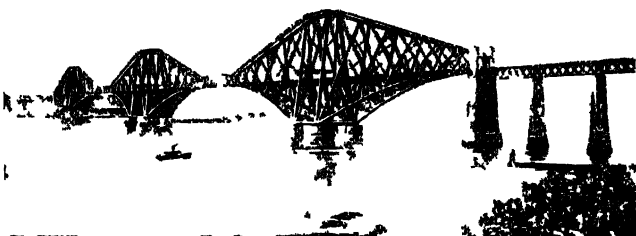
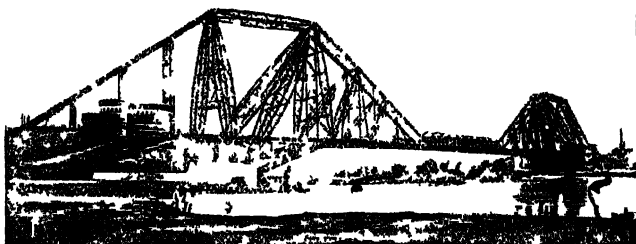
In the same way, the diagram of Fig. 18 suggests an improved form of cantilever, in which the varying depth may follow approximately the proportions of the figure FgH contained between the rising curves Fg and Hg and the straight line FH . Thus, the cantilever would have an apex at the point of support, while the depth tapers away in hollow curves towards the ends. The altered configuration is illustrated in Figs. 22, 23, and 24, which represent the mere outlines of the cantilevers used in the Niagara, the St. John River, and the Forth Bridges respectively.

In each of these examples the bridge terminates at the point H , so that the arm GH does not carry the weight of a beam HK , as in Fig. 17, but the rear end of the cantilever is held down at the point H by anchoring it to the masonry abutments. The bending, therefore, is of one kind throughout the length FH ; the upper member is in tension, and the lower member in compression, so long as the bridge is fully loaded. In American examples the tension member is a linked chain of long bars. The compression member in the Forth Bridge is a pair of hollow steel tubes. The outline of the Danube cantilever bridge is sketched in Fig. 25. Here the point H is one of the virtual hinges, carrying the end of the girder HK .

Lastly, it may be remarked that in large girder bridges of every kind it is necessary to provide for those changes of length which result from changes of temperature. Independent girders are generally held at one end and supported by rollers at the other end. Continuous girders are fixed to one support, and allowed to expand in both directions; while the detached span in a cantilever bridge is hinged to one cantilever, and is free to travel upon the other.

The short line of railway from Edinburgh to Dundee crosses two of the most remarkable of existing girder bridges. The Tay Bridge, consisting of a large number of independent spans, has a total length of two miles, which is greater than in any other example. The Forth Bridge contains two great cantilever spans of 1,710 ft., which is the greatest width that has yet been spanned by any form of bridge construction.

Arched ribs of iron and steel.
—In a preceding paragraph it was remarked that the curved parabolic member of the bow-



Cantilever Bridges

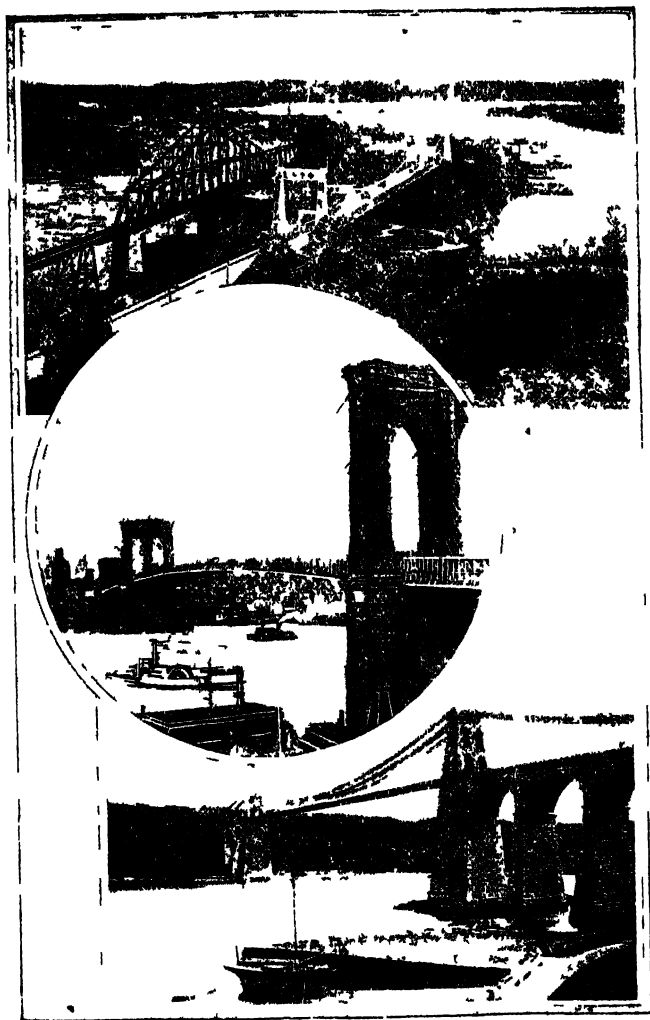
- 1 Lansdowne Bridge over the Indus Sukkur India (Sir A. M. Rendel) 2. Forth Bridge
3 Niagara River Cantilever Bridge

string girder in Fig. 19 takes the character of a linear arch, transmitting a thrust through its entire length, while the lower member of the girder is simply a straight tie uniting the ends of the bow. If the bow could be made to spring from a pair of unyielding abutments, there would remain no measurable stress in the tie or in the diagonals of the web. If these were removed, the bow would remain alone as a slender arch, and would carry the same load without experiencing any greater stress than that which it had to endure as a member of the girder. There are many situations in which solid masonry abutments can readily be constructed of sufficient strength and stability to resist the thrust of the arch, and in such situations the arch offers great advantages as compared with the girder.

If the arch were merely a line or slender rod bent to the parabolic curve, it might still be in a condition of equilibrium under the uniform load; but the equilibrium would be unstable, and the arch would collapse with the slightest movement of the load. The arched rib is therefore designed in such sectional form as to ensure a considerable transverse stiffness—sufficient to resist the distorting effect of an irregular load. With this object the curved rib is generally designed with a section like that of a shallow girder, its depth being a small fraction of the rise of the arch. In small bridges the rib is often formed with a plate web, the sections being similar to that of the plate girder in Fig. 9; while in very large bridges the curved rib resembles a curved lattice girder consisting of two concentric members braced together: the arch-thrust is then divided between the two members, though it cannot always be equally shared by both.

By either form of construction it is easy to ensure a sufficient degree of transverse stiffness; but the stiffness of the arched rib may act prejudicially when the structure is subjected to changes of temperature. When the temperature rises, the expansion of the curved rib compels it to bend upwards at the crown, because it cannot extend the width of its span, and the increased length must be accommodated between the unyielding abutments. This inevitable bending of the rib with every change of temperature is necessarily attended with certain bending stresses which will be very severe if the rib is very stiff, and they can only be moderated by reducing the stiffness. To reconcile these conflicting requirements, it is necessary to provide for the expansion of the arch by mechanical expedients which shall not weaken the resistance of the rib to the bending effects of irregular loading; and this is effected with more or less completeness by the introduction of hinges.

In a large number of modern examples, including some of the fine arched bridges which cross the Rhine and the North Sea-Baltic Canal in Schleswig-Holstein, the arched rib is hinged at the two extremities. These hinges permit a freedom of angular movement at each abutment, enabling the rib to take a continuous curvature in one direction throughout its length, and to accomplish the inevitable bending more easily, so that the resulting stress is much less severe than it would have been if the rib were fixed to the skewback. The stress which still has to be endured is chiefly felt at the crown, and it becomes a matter of small importance when the arch is designed with a great rise and a moderate depth of rib. Thus, by way of example, the French engineers found no great



Suspension Bridges

- 1 Suspension Bridge, St John N B (Cantilever Bridge alongside) 2 Brooklyn Bridge, New York 3 Menai Suspension Bridge

difficulty here in carrying out their bold plan for the very tall arches of the Douro Bridge and of the Garabit Viaduct, near St. Flour, in the French department of Cantal. The largest steel arch that has yet been constructed is to be found, however, in the new bridge which crosses the Niagara in a single span of 840 ft. The arch is hinged at each end, and has a rise of 150 ft., while the depth of the open lattice rib is only 15 ft., and with such proportions the temperature stresses are not at all severe.

But the mechanical purpose is more perfectly carried out when a third hinge is introduced at the crown of the arch; and if the abutments can be relied upon, the central hinge in a single span does not necessarily impair the stability of the structure. On the other hand, it relieves the rib almost entirely from the bending stresses which are due to changes of temperature, and also from those which result from elastic compression of the arch. This method has been boldly applied by the French engineers in the Viarv Viaduct, in the south of France, in the very flat arches of one of the Seine bridges, and also in the construction of arched roof-trusses of large span. The stability of the abutments and of their foundations becomes a matter of increasing importance when the arch is designed with a great width of span and a relatively small rise. The choice between the arch and the girder is therefore very much influenced, in many cases, by the natural character of the foundations.

Suspension bridges have been used in all countries for the purpose of carrying a roadway at low level over rivers of great width; and in many situations they present certain advantages in the lightness of the superstructure and the facility with which it

can be erected. The most notable of English examples are, perhaps, the Menai Strait Bridge, the Victoria Bridge at Battersea Park, London, and the Clifton Suspension Bridge over the Avon at Bristol. The last-named structure, like the Clifton Suspension Bridge in America, crosses a deep ravine, where an arch might have been preferred but for the greater difficulty of erection. The American example has now been replaced by the hinged arch already referred to.

In the English bridges above mentioned, and in many continental ones, the floor is suspended by vertical rods attached to the successive links of the main chains; and each link of the chain consists of a number of long flat bars connected to the bars of the next link by steel pins. In America the same form of tension-member is used in the construction of girders, but wire cables are generally employed for the principal member of a suspension bridge.

The main span of the bridge is flanked on either side by a pair of towers which rise to a considerable height above the roadway. The chain or cable is laid across the tops of the towers, and hangs between them in a curve which is nearly parabolic, and is always the funicular curve for the actual loading, whatever the loading may be. The funicular curve cxy has been drawn in Fig. 18 to a certain vertical scale; but the chain can, of course, be adjusted to any dip, and the dip cx_2 is generally not more than one-twelfth to one-sixteenth of the span. From the summit of each tower the chain is led down to an abutment placed at some distance behind the tower, so that on each side it extends across an opening between tower and abutment. The bridge, therefore, is often designed for crossing three openings; and the road-

way is suspended from the chain across the side spans, the chain falling into parabolic arcs like the curves CRA and gHK in Fig. 18. The Victoria Bridge, the great Brooklyn Bridge at New York, and the Cincinnati Bridge are examples of this kind. In other cases the object has been simply the bridging of a single wide opening from tower to tower, and the chain is then stretched, in a nearly straight line, from tower to abutment. These portions of the chain, carrying no load beyond their own weight, are called 'backstays.' In either case the two ends of the chain are securely anchored into solid and heavy abutments. The Clifton Suspension Bridge is an example of the single span, and here the anchorage for the backstays is obtained by tunnelling into the natural rock.

The towers are always designed to act merely as vertical pillars. The chains are not attached to them, but are carried in some kind of saddle or carriage which is free to travel longitudinally upon the top of the tower. When the temperature rises, the curved chain finds accommodation for its expanded length by assuming a greater dip (corresponding to the increased rise in the heated arch). The expansion of the straight backstay is allowed for by a movement of the saddle upon its rollers. When the disposition of the load is in any way altered, the chain finds for itself a new position of equilibrium, letting down the more heavily loaded parts of the roadway, and raising those which are more lightly loaded. The equilibrium is always stable, but the vertical movement will often develop oscillations of considerable amplitude. The vibrations are kept within narrower limits when the chain is subjected to a severer pull and stretched in a flatter

curve. But the chain bridge can hardly be used for railway traffic without some kind of stiffening. With this object, the floor is often stiffened by roadway girders, and the girders are sometimes hinged in the centre to avoid the incidence of severe temperature stresses; while American cable bridges are further stiffened by a series of radiating straight ties extending from the top of each tower to a number of points along the roadway. In some cases the main superstructure has consisted of straight radiating links, and their weight has been supported by an auxiliary overhead cable. All these expedients afford in some degree a remedy for the flexibility of the chain; but although this flexibility is precisely what has given shape and being to the suspension bridge, yet it does not constitute an essential feature of the system, nor a necessary accompaniment. In the suspension bridge flexibility is less harmful, but not more desirable, than in the arch; and the conflicting requirements being the same in both, they can be met by similar expedients. This has been accomplished to some extent in the design of a few hinged suspension ribs.

Movable bridges have long been used in fortification with the object of intercepting communications; but in civil engineering they are used for maintaining the traffic on two crossing lines of communication. Thus, a bridge which carries a road or a railway across a navigable channel at low level must occasionally be opened for the passage of shipping; while the Manchester Ship Canal is crossed by a movable bridge which carries another canal over it. Such bridges may be classed under different heads, according to the movement which is imparted to the girder super-

structure in order to open the way for navigation, or to close the bridge for restoring the upper line of traffic.

Roller bridges are those in which the girder is carried upon wheels or rollers, and travels in a straight line across the waterway. In general the weight of the moving girder is supported upon the fixed portions of the structure. The caissons which are used for closing the entrance of graving docks, and which carry a line of roadway across the top, are sometimes made to travel on rollers across the floor of the dock, and may be included among roller bridges.

Bascule bridges are those which rotate upon a horizontal axis, as in some of the drawbridges of mediæval castles. The roadway platform may be compared to a hinged flap which is drawn up to allow the passage of vessels; and the navigable opening may be spanned by one or by a pair of such flaps meeting in the middle. A new form of bascule bridge, operated electrically, was erected over the Chicago R. at Ashland Avenue in 1903.

Swing bridges are easily distinguished from either of these types, and for many reasons they are generally preferred by engineers for the movable spans of large railway bridges. They are made to rotate about a vertical axis, the weight of the swing-span being carried upon a turntable. The live-ring of the turntable contains a number of conical steel rollers, which turn upon radial axles and travel round a circular roller-path. An upper inverted roller-path travels in the same way upon the rollers, and carries the main girders of the swing bridge. In a few examples the navigable opening is spanned by two swinging cantilevers which meet in the middle; more frequently by a single arm which

rotates upon a turntable placed on one side of the opening, the arm being duly counterbalanced at the rear end. When the navigable channel is very wide, it may conveniently be divided into two openings, spanned by a double-armed swing bridge rotating upon a central tower which stands between the two openings. In this case the girder becomes a balanced cantilever with two equal arms, supported upon the turntable in the middle of its length. When the bridge is closed by turning it into the line of the railway, the girder is made to take a bearing upon the two abutments, and is converted into a continuous beam of two spans. This is effected by the employment of mechanical appliances for the due adjustment of the three supports. The form of the elastic girder is thus changed from that of a drooping cantilever to that of a continuous beam, having a point of contrary flexure in each span. In some examples the weight of the swinging cantilever has been carried upon the head of a hydraulic ram, which becomes the central pivot of the turntable, and the load is wholly supported by the pressure of the fluid on which the ram rests and turns. The adjustment above referred to can then be made by the hydraulic raising or lowering of the ram. For all operations connected with the working of movable bridges hydraulic power is the most convenient, and is generally employed.

Military bridges.—Military bridging differs from other kinds in that (1) speed in construction is generally essential; (2) the materials must be so light as to be easily transported, or else must be rapidly extemporized locally; (3) time does not usually admit of very much calculation. The bridging duties of the British

army are carried out by the bridging battalion and field companies of the Royal Engineers. Rivers are crossed by laying the roadway of the bridge on pontoons, on rafts of casks and timbers, or on ordinary boats. In every case the floating pier is anchored on the up-stream side, or on both. At each end of the bridge one or more piers of piles or trestles are usually built, to allow for the rise and fall of the tide. If the river is sufficiently shallow, and more time is available, bridges resting on trestles or crib-piers are constructed. Where good holding ground exists on both sides of a small stream or ravine, the gap is spanned by a bridge built on spar-frames resting on each bank and locking in the centre. In this way a single lock bridge will span a thirty-foot opening, a double lock forty-five, a single sling sixty, and a treble sling eighty feet. Wide and very deep chasms are crossed by suspension bridges, the materials used including iron chains, steel-wire ropes, hemp ropes, and even, in emergency, hide thongs and ropes of grass or creepers twisted together. A flying bridge is one in which the action of the current is made to move a boat or a raft—anchored by a long rope to the bank or to the centre of the river—across the stream by acting obliquely against its side. Another way is to stretch across the river a stout cable on which hangs a pulley, to which are attached the floating platform and two lines for hauling it from bank to bank.

See J. C. Fidler's *Bridge Construction* (3rd ed. 1901), and W. Humber's *Iron Bridge Construction* (3rd ed. 1870); *Modern Road and Railway Bridges*, by W. Maw and J. Dredge (1872); Baker's *Strength of Beams, Columns, and Arches* (1870), and *Long Span Railway Bridges* (new ed. 1873).

IV.

Numerous examples are illustrated in the *Trans. Inst. C.E.* For legal questions in respect of bridges, see HIGHWAYS.

Bridge, a game at cards. The origin of bridge is uncertain. A hybrid form of it was played in Constantinople as far back as 1860. A variation has long been popular in Holland, and another in Russia, where it is known as *yerelash*. From Constantinople it made its way to Alexandria, and into the French clubs of the Riviera. In its present form and name it first appeared in Paris about 1892, and from thence was taken to America. In 1894 Lord Brougham gave it its first introduction into London at the Portland Club, and in the course of the next year or two it had won its way into general favour.

Bridge is a game for four persons, two being partners against the other two, and an ordinary pack of fifty-two cards is used. Only three persons actually engage in playing the cards, for the dealer's partner always stands out, his cards being exposed as a dummy hand, and played by the dealer in partnership with his own. The game then resolves itself into one of single dummy whist (see WHIST). Outside the active play of the hands, bridge differs *in toto* from dummy whist.

The dealer serves out the whole fifty-two cards singly, without turning up the last one of the pack. The four players examine their hands, and the dealer then has the privilege of determining what suit shall be trumps, or whether he shall declare 'no trumps,' and has to announce it. Should he consider it undesirable to exercise the option, he passes the selection on to his partner; and the latter is then bound to name a suit, which becomes the trump suit for that deal.

10a

As in whist, every trick over six taken by one side is scored as an overtrick, but in bridge its scoring value is regulated by the suit that is made trumps, on the basis tabulated further on. When the trump suit has been named, it is at the option of either adversary—the one to the dealer's left having priority—to double its scoring value by saying, 'I double;' so that each overtrick in spades would now be 4, in clubs 8, and so on. The dealer who declared trumps, or, failing him, his partner, may now redouble, and the other side can redouble again, until 100 points—the usual limit—on each overtrick is reached. The question of doubling or not doubling having been settled, the player on the dealer's left leads out a card to the first trick, and the dealer's partner then, and not till then, spreads out his thirteen cards in their suits face upwards on the table, and, as far as he is personally concerned, takes no further part in that game except (1) to assist his partner by drawing a card from the dummy as he names it, or (2) should his partner renounce, to ask him if he has no more of the suit.

A game consists of 30 points, made up exclusively of overtrick scoring, whether on 'doubles' or otherwise. Should a win carry the score over 30, the surplus points are taken into account when the score is settled at the end of the rubber. Every deal must therefore be played out, whether the game be won before its conclusion or not. The best two games out of three win the rubber, and for that a score of 100 points is taken.

There are five honours in bridge—the ace, king, queen, knave, and ten of the trump suit. In a 'no trump' declaration (termed 'sans atout' in some card circles) the four aces are the only honours.

Any three trump honours held singly or conjointly by one side score twice the single value of a trick in the suit. Four honours held between partners score four times the trick value; but held by one player, they score twice as much, or eight times the trick value. There are three ways of scoring five honours: held in one hand, they count ten times the trick value; held between partners, four in one hand and one in the other, they count nine times the trick value—eight times for four in one hand, and once for the fifth honour with the partner; or divided, three and two, they score five times the trick value. In 'no trumps,' three aces, held either conjointly or by one player, count 30; four aces between partners score 40; four aces held in one hand score 100. When each side has two aces there is no honour score. When, on a trump declaration, a player has none of the trump suit, he has 'chicane,' and adds to his honour score twice the value of the trick. For a 'grand slam' by one side—making the whole thirteen tricks—40 points are placed to the honour score; for making a 'little slam,' or twelve tricks, 20 points. The honour score is in no way affected by doubling, which applies to the trick score only. Honours are not added up till the finish of the rubber.

The score is generally kept on a sheet of paper ruled in the form of a long cross, with the horizontal line a little above the centre. This admits of the trick and honour scores being kept separate, and ultimately added up together in one sum. It is usual to keep the score of your own side in the longitudinal division on the left, and the adversaries' score in the division on the right. The honours are recorded in the top division, be-

ginning from the cross line, and are continued upwards; while the overtricks are registered immediately below the line, and are scored downwards.

The declaring hand should hold not less than four reasonably certain tricks. The trump suit should be sufficiently strong either to capture the adverse

THE TRICK SCORE.

Each trick above six counts—

When spades are trumps	2 points.
When clubs are trumps	4 ..
When diamonds are trumps	6 ..
When hearts are trumps	8 ..
When there are no trumps ('sans about')	12 ..

THE HONOUR SCORE.

	In Spades.	In Clubs.	In Dia- monds.	In Hearts.
Three honours in one hand or between partners count	4	8	12	16
Four honours between partners	8	16	24	32
Four honours in one hand	16	32	48	64
Five honours—three with one partner, two with the other	10	20	30	40
Five honours—four with one partner, one with the other	18	36	54	72
Five honours in one hand	20	40	60	80
Chicane counts	4	8	12	16
When there are no trumps—				
Three aces held in one hand or between partners count				30
Four aces held between two partners				40
Four aces held in one hand				100
Grand slam counts 40; little slam counts 20.				

As regards the stakes, it is estimated that half a crown per 100 at bridge is equivalent to shilling points at short whist. The best plan is to fix the price at an amount per hundred easily divisible into ten, such as tenpence, half a crown, or five shillings. Any odd excess points under 5 are not taken into account, but over 5 they count as a full 10. Bridge is looked upon as rather a gambling game, but as the stakes can be set as low as a farthing for 10 points, it is not so necessarily.

In 1895 a set of laws was drawn up by a special committee of the Portland Club, which has been revised and generally adopted.

trumps, or to clear them out and still hold a last one or two trumps in reserve. With one or two set tricks only in your hand, pass the call to your partner. When the adversaries are high up in the second game of the rubber and you are low down, a 'no trump' call should be risked on a hand that, were the scores reversed, would be a 'pass.'

With three aces and other probable tricks declare 'no trumps' (on a passed call dummy should declare 'no trumps' with three aces and no other likely trick). Always declare 'no trumps' with four aces, even if there is not the smallest prospect of making another trick. At the worst

you can only score three by tricks, which, doubled, would only lose 72, against which you are compensated in advance by an honour score of 100; and the prospects of finding your partner with a hand sufficiently good, when supported by your four aces, to enable you to conjointly make the odd trick or more, are distinctly in your favour.

Do not double unless you are practically sure of making the overtrick, or your chances of doing so are promising, and the double is necessary to put you to game. Never redouble unless your prospect of winning is almost certain. It is always safer to double when you sit over the trump-making hand—i.e. to his left—than when hesitates over you. Beware of doubling spades unless you have practical control of the suit, for the caller may have extreme length and strength in them; and should he redouble, the overtricks are 8 each, the same value as hearts. Beware of doubling on a questionable hand if the adversaries need a doubled or a redoubled odd trick to win, more especially if the double or redouble cannot put you to game if you get the odd trick.

Always consider the state of the score before declaring or doubling; and as dealer, always summarize your own and dummy's best chance of getting to game, before following to the first lead. Never take unnecessary risks. When you have a strong black suit that will carry you out, do not chance a doubtful red or 'no trump' declaration; but when the opponents are almost certain to win the game on the next deal if you fail to do so on the current one, take any reasonable risk that may be likely to attain the desired result.

A popular variety of the game is auction bridge, which is after all a sort of mixture of bridge and

nap; each player bidding against the other in value of suits, and the highest bidder taking the deal.

See Badsworth on Bridge, 'Hellspon't' on Bridge, Dalton's *Saturday Bridge*, Doe's *Bridge Manual*, Dunn's *The Bridge Book*, Elwell's *Advanced Bridge*, Foster's *Bridge Tactics and Complete Bridge*, E. Anthony's *The Complete Bridge Player* (1905), and W. Dalton's *Auction Bridge* (1908).

Bridge, SIR CYPRIAN ARTHUR GEORGE, G.C.B. (1839), British admiral; served in the Crimea, in the Indian mutiny, and on the Burmese frontier. From 1889 to 1894 he was director of naval intelligence, and from June 1901 to 1904 he was commander-in-chief on the China station. In 1904, with Mr. Aspinall, K.C., he held an inquiry at Hull on the Dogger Bank incident. He has published *The Art of Naval Warfare* (1907); and *Sea, Power, and Other Studies* (1910).

Bridge, SIR FREDERICK (1844), organist of Westminster Abbey since 1875, was born at Oldbury, Worcestershire; studied music under Sir John Goss; organist, Trinity Church, Windsor (1865-9); and organist, Manchester Cathedral (1869-75). He has since been professor of harmony at Owens College and Royal College of Music, and has been Gresham professor of music since 1890, conductor of the Royal Choral Society since 1896, and since 1902 King Edward professor of music in University of London. His principal works are *Counterpoint* (1877), *Musical Gestures* (1894), *Rudiments in Rhyme* (1896), *Mount Moriah* (1874), *Boadicea* (1882), *Rock of Ages* (1886), and *The Incecape Rock* (1891). He was knighted in 1897.

Bridgend, mrkt. tn., Wales, in Glamorganshire, 20 m. W. of Car-

diff; has two lunatic asylums, steam joinery works, tanneries, blast-furnaces, coal mines, and stone quarries. Pop. 6,000.

Bridgenorth. See BRIDG-NORTH.

Bridge of Allan, par., tn., and health resort, par. of Logic, Stirlingshire, Scotland, on Allan Water, trib. of river Forth; on C.R., 2 m. N. of Stirling; mild climate; hydropathic, baths and mineral well; has paper mills and dyeworks; also an annual Highland gathering in August. Pop. 3,300.

Bridge of Weir, tn., Renfrewshire, Scotland, 13 m. w. of Glasgow; has calico printing. Here are Quarrier's Orphan Homes. Pop. 2,300.

Bridgeport, city and seapt., Connecticut, U.S.A., co. seat of Fairfield co., 18 m. s.w. of New Haven, on an inlet of Long Island Sound. It is connected with New York city by daily steamers. It is a great manufacturing centre, the most important branches being corsets, sewing-machines, carriages, and firearms. Pop. 102,000.

Bridges, ROBERT SEYMOUR (1844), English poet and critic, was born at Walmer, Kent. He studied medicine at St. Bartholomew's, London, and practised in London until 1882. While in London, Mr. Bridges had become known to a small circle as a fine writer of delicate lyric poems in the Elizabethan manner. Since 1882 he has devoted himself seriously to literature; writing, besides lyrics, narrative poems, sonnets, and a series of interesting plays in various experimental manners. The following are some of his works:—*Poems: The Growth of Love* (1876; enlarged 1890); *Eros and Psyche* (1885; revised 1894); *Eden: an Oratorio* (1891); *Purcell Commemoration Ode*, etc. (1896). Plays: *Prometheus the Fire-giver* (1883, 1884);

Nero (two parts, 1885); *Feast of Bacchus* (1889); *Christian Captives* (1890); *Humours of the Court* (1893); *Demeter: a Mask* (1905). Poetical works: Complete edition (1898-1905); Criticism, etc.; *Milton's Prosody* (new ed. 1893); *John Keats* (1895, 1896), in Musos' Library. See Dowden's *The Poetry of Robert Bridges* (1894).

Bridget, St. (1302-73), was born near Upsala, Sweden; after a pilgrimage to St. James of Compostela in Spain, retired (1344) to a convent, where the rule of 'the Saviour's Order after the reformed rule of Augustine' was revealed* to her, and she built the first monastery of the order at Vadstena, in E. Gothland—a monastery which flourished until its suppression in 1595. Bridget repaired in the jubilee year 1350 to Rome, where she lived till her death. Her body was conveyed to the monastery of Vadstena. She was canonized in 1391. Her day is October 8.

Bridget, St., of Ireland. See BRIGIT.

Bridgeton, city, New Jersey, U.S.A., the co. seat of Cumberland co., 37 m. s. of Philadelphia, on both sides of the Cohansey R. It has a large trade in pig iron and ore, lumber, lime, and coal, and manufactures nails, glass, woollens, flour, and canned goods. Pop. 14,000.

Bridgetown, seapt. and cap. of Barbados, W. Indies, on the N.E. shore of Carlisle Bay, a fine spacious roadstead affording safe anchorage for the largest ships, and situated on the w. coast of the island. It is a port of call for steamers, and the headquarters of the Royal Mail Steamship Company. The exports include sugar, molasses, aloes, and mineral oil. The total trade is valued at about two millions sterling annually. It is the seat of the bishop of Barbados. Pop. 35,000.

Bridgewater, **tn.**, Plymouth co., Massachusetts, U.S.A., 26 m. s. by E. of Boston; manufactures cottons, shoes, bricks, and paper. Pop. 7,000.

Bridgewater, **FRANCIS EGER- TON**, **THIRD DUKE OF** (1736-1803), succeeded to the title on the death of his elder brother (1748). On the advice of James Brindley (see **BRINDLEY**, **JAMES**) he constructed a canal (1758-71) which was 77½ m. long, and spanned the Irwell from Worsley to Manchester (afterwards extended to the Mersey), at an expenditure of £220,000. In 1887 the canal was sold to the Manchester Ship Canal Company.

Bridgewater, **FRANCIS HENRY EGERTON**, **EIGHTH EARL OF** (1756-1829), son of John Egerton, bishop of Durham (1721-87), succeeded his brother in 1823. He lived for years at Paris, where the Hôtel Egerton was notorious for its swarm of cats and dogs dressed as human beings, and the flocks of birds with clipped wings in its gardens. In addition to bequeathing £12,000 to the British Museum to buy MSS., he left £8,000 to be given for the best work 'On the Power, Wisdom, and Goodness of God, as manifested in the Creation,' to be awarded at the discretion of the president of the Royal Society, and by him allocated to—(1) Dr. Chalmers, *The Adaptation of External Nature to the Moral and Intellectual Constitution of Man*, 1834; (2) Dr. William Prout, *Chemistry, Meteorology, and the Function of Digestion, considered with reference to Natural Theology*, 1833; (3) Rev. William Kirby, *On the History, Habits, and Instincts of Animals*, 1833; (4) Dr. Kidd, *The Adaptation of External Nature to the Physical Condition of Man*, 1833; (5) Sir Charles Bell, *The Hand, its Mechanism and Vital Endowments, as evincing Design*, 1834; (6) Dean Buckland, *On Geology and Mineralogy*, 1836;

(7) Dr. Whewell, *Astronomy and General Physics, considered with reference to Natural Theology*, 1833; (8) Dr. P. M. Roget, *Animal and Vegetable Physiology, considered with reference to Natural Theology*, 1834. These form the *Bridgewater Treatises*.

Bridgewater Canal, the first in England, runs from Manchester to Runcorn on the Mersey, with a branch to Leigh. It is carried across the Manchester Ship Canal by a swing aqueduct.

Bridgewater Treatises. See **BRIDGEWATER**, **EIGHTH EARL OF**.

Bridgman, **LAURA DEWEY** (1829-89), a native of Hanover, New Hampshire, U.S.A. At the age of two, as the result of an attack of fever, she lost sight, hearing, smell, and (partly) taste, and, along with these, the power of speech. From the age of eight years and onwards, under the tuition of Dr. Howe of Boston, she acquired the power of reading and speaking with her fingers; and subsequently she learned geography, history, algebra, and even acquired proficiency in needlework and household duties; while she was an adept at teaching others similarly afflicted. An exactly analogous case is that of Helen Keller, another American residing in Alabama, who, in spite of infirmities like Laura Bridgman's, has been taught English, French, German, Latin, and Greek; to speak, to write, and to typewrite. See *Life and Education of Laura Dewey Bridgman*, by Miss Lampson (1873), and *The Story of my Life*, by Miss Keller (1903).

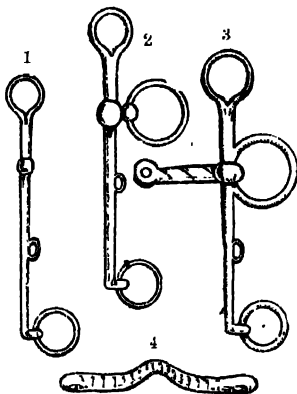
Bridgnorth, munic. bor. and mrkt. tn., Shropshire, England, on Severn, 18 m. S.E. of Shrewsbury; has industries of carpet-weaving, worsted-spinning, tanning, and malting. Thomas Percy, author of *Reliques of Ancient English Poetry*, was born here in 1728. Pop. 6,000.

Bridgwater, munic. bor., seapt., and mrkt. tn., Somersetshire, England, on the Parret, on G.W.R., 12 m. N.N.E. of Taunton; trades with the United States, W. Indies, Canada, etc. exports bath-bricks, earthenware, cement, and bricks. The town existed in Saxon times. Monmouth was proclaimed king in the old castle in 1685. Admiral Blake was born here in 1598. Pop. 15,000. See *Powell's Bridgwater* (1908).

Bridle, the head harness of a horse or other beast of burden. Bridle bits are of three kinds—snaffles, curb bits, and stiff bits. The snaffle has two bars, jointed together in the middle, with rings at the ends for the reins. It sometimes has cheek pieces to prevent the ring pulling into the horse's mouth. The curb bit comprises cheek pieces or branches with eyes for the cheek straps and the reins, and holes for the curb-chain; a mouth piece, uniting the cheek pieces and forming the bit proper, sometimes a bar uniting the lower ends of the branches;

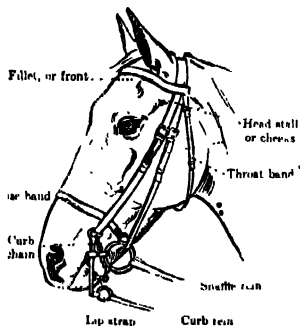
bit is made of twisted wire with a soft rubber covering.

A double-ringed snaffle will suit almost any horse; and if a little



Forms of Bridle.

1. Kent Weymouth. 2. Princess Weymouth. 3. Pelham. 4. Bit, showing the 'port.'



Parts of Bridle.

and a curb-chain. The elastic bit consists of a chain covered by closely-coiled wire between the bit rings. Another form of elastic

extra power is needed, a jointed or twisted snaffle may be used. In particular cases, the sliding mouth bits and those having small ports may be resorted to; but they are frequently used when there is no need for them, and when the simple bits, if properly placed on the bridle, would be sufficient. If a bit is very tight, a horse cannot be expected to obey his driver, as it deprives the mouth of feeling.

The two most popular forms of bridle are the double or Weymouth bridle, and the Pelham bridle, a modification of the former.

Bearing reins—to which many are opposed—are used for supporting the horse's head, and in the simple form are attached to a loop in the bit, from which they are carried through a loop or

swivel attached to the throat, and then to the tenet on the pad. In its more powerful form the bearing rein is known as the gag. In this case it is attached to a billet stitched to the head piece, and is passed through a swivel on the end of the gag, and then to the tenet. Two bits are used at once with the gag, one being the ordinary driving bit and the other a bridoon bit, which is usually jointed in the centre and fitted with a ring or swivel at each end for attaching the bearing rein. See Major Francis Dwyer's *Seats and Saddles, Bits and Biting* (3rd ed. 1879).

Bridlington, or **BURLINGTON**, bor. and seaside resort, Yorkshire, England, 17 m. S.E. of Scarborough. The harbour has two stone piers, and the bay, protected by Flamborough Head and the Smithwick Sand during northerly gales, forms the only safe anchorage on the east coast of Britain between Harwich and Leith. Pop. 12,000. See J. Thompson's *Hist. Sketches of Bridlington* (1821).

Bridport (656 ac.), seapt., munic. bor., and par., Dorsetshire, England, on the Brit. 18 m. W. of Dorchester; manufactures cordage, ropes, and sailcloth, and has flax mills. Pop. 5,700.

Bridport, **SIR ALEXANDER HOOD**, FIRST VISCOUNT (1727-1814), English admiral, son of a Devonshire clergyman, and the younger brother of Admiral Viscount Hood. He was in charge of the *Minerva* at Hawke's action in Quiberon Bay in 1759, and in the same frigate he captured the *Warwick* in 1761. In 1777 he commanded the *Robust* in the action off Ushant. In 1780 he became rear-admiral, and two years later led a division of Lord Howe's fleet to the relief of Gibraltar. He was second to Lord Howe in the victory of June 1, 1794, and for his services received an Irish

peerage, as Baron Bridport. In 1795 he defeated the French off l'Orient, capturing three 74's. In 1796 he was made vice-admiral and a peer of the realm, and was placed in command of the Channel fleet on Lord Howe's retirement—a position he held till 1800. In 1801 he was further rewarded with a viscounty and the generalship of marines. By the seamen he was known as 'Lord Breadbags.'

Brief, in English law, is a memorandum of instructions, concisely expressed, drawn up by an attorney for the guidance of the barrister, containing a statement of the facts, points of law, etc., to be developed and expanded before the court, or to be used in the cross-examination of witnesses. As soon as counsel is briefed he has authority to act as his client's representative in all matters involved in the litigation. The brief is always endorsed with the title of the court and of the action, and with the names of the counsel and of the solicitor who delivers it. In Scots law the corresponding term is 'Memorial,' which is drawn up by a solicitor or law agent.

Brief, **PAPAL**, a state document from the Pope to an individual or to a religious community, giving advice or exhortation upon matters of difficulty or of discipline. It is dated *Adie Nativitatis*, and sealed with the Pope's signet ring, the seal of the fisherman; while a bull is dated *Adie Incarnationis*, and is signed by the functionaries of the papal chancery. A brief also differs from a bull in being of a less formal and weighty character.

Brieg. (1.) Town, prov. Silesia, Prussia, on high ground on the l. bk. of the Oder, 26 m. by rail S.E. of Breslau, cap. of the former duchy of Brieg (1348-1675). The castle (1544) of the former dukes, with a fine façade, is now a store-

house. The town was taken by the Prussians in 1741, and by the Bavarians in 1807. Pop. 28,000. (2.) Also called **BRIG** and **BRIGUE**, small and picturesque tn., canton Valais, Switzerland, at beginning of ascent to the Simplon Pass, and at Swiss mouth of the tunnel, 90 m. by rail E. of Lausanne, and 15 m. below the hospice on the summit of the Simplon. Alt. 2,244 ft. Pop. 2,200.

Briel, or **BRIELLE**, fort, seapt. tn., prov. S. Holland, Netherlands, at the mouth (s. bank) of the New Maas, and on the island of Voorne, 14 m. w. of Rotterdam. It is the birthplace of Admiral M. Tromp. Its capture by the patriotic Beggars of the Sea (Gueux) in 1572 marked the beginning of the war of independence against Spain. Pop. 4,000.

Brienne, **JOHN I.**, COUNT OF (1148-1237), king of Jerusalem and emperor of the Latin empire of Constantinople, in 1212 became king-regent for his daughter Yolande. In 1218 he took part in the fifth crusade, led by Andrew, king of Hungary, and besieged Damietta, which capitulated in 1219. In 1225 he married his daughter to the German emperor Frederick II., with the condition that he should remain king of Jerusalem for life. But as Frederick did not observe this condition, John was driven to seek refuge at the papal court. In the quarrel between Pope Gregory IX. and the Emperor Frederick, John commanded the papal forces, but was defeated in 1229. In the same year the barons of Constantinople elected him emperor, during the minority of Baldwin II. In this capacity he defeated the united forces of the Greeks and Bulgarians (1236). See E. Georges' *Jean de Brienne* (1858).

Brienz, a considerable village in the Swiss canton of Bern, and

the centre of the wood-carving industry. It is the starting-point of the railway up the Brienzer Rothorn. Brienz is built at the N.E. extremity of the lake of the same name (11½ sq. m. in area, 1,857 ft. above the sea-level, and 853 ft. in depth), opposite Giessbach waterfall. Pop. 2,600.

Brierley, **BENJAMIN** (1825-96), writer and poet in the Lancashire dialect, was born at Failsworth, near Manchester. In 1863 he became sub-editor of the *Oldham Times*, and in 1864 his first story, *The Laycock of Langley-side*, appeared. In 1869 he started the publication of *Ben Brierley's Journal*, first as a monthly and then as a weekly magazine, and continued to edit it until 1891. He also published *Irkdale* (1865), *Marlocks of Merriton* (1867), *Red Windows Hall* (1867), *Ab-o'-th'-Yate in London* (1868), *Cotters of Mossburn* (1871), *Home Memories* (1886), *Cast upon the World* (1887), and *Spring Blossoms and Autumn Leaves* (1893).

Brierley Hill, eccles. par. and mrkt. tn., Staffordshire, England, on Stour R., 2 m. N.E. of Stourbridge; has coal and ironstone mines, and deposits of fireclay, which have been worked for centuries. The industries are glass-bottle-making, brick and earthenware manufacturing, chain, nail, and spade making. Pop. 12,000.

Brierly, **SIR OSWALD WALTERS**, (1817-94), English marine painter, born at Chester. In 1850, with the Hon. Henry Keppel, he visited New Zealand, the Society Is. and the Friendly Is., crossed the Pacific to Valparaiso, returning to England by the Strait of Magellan, and illustrated Keppel's account of the voyage. During the Crimean war he published a series of lithographs, *The English and French Fleets in the Baltic, 1854*. He took sketches for Queen Victoria of the naval review at Spithead (1856). He accompanied the

Duke of Edinburgh round the world (1867-8), and the Prince (King Edward VII.) and Princess of Wales on their tour to the Crimea, Constantinople, and Egypt (1868). After being appointed marine painter to Queen Victoria (1874), he was knighted (1885). Among his well-known works are *The Retreat of the Spanish Armada* (1871), *Drake taking the 'Capitana' to Torbay* (1872), *The Loss of the 'Revenge'* (1877), and *The Decisive Battle off Gravelines* (1881).

Briesen, tn., W. Prussia, Germany, 40 m. E. by N. of Bromberg. Pop. 7,500.

Brieux, EUGÈNE (1858), French dramatic author, born at Paris. He wrote his first play, *Bernard Palissy*, in 1879, but only became known in 1890, when his *Ménages d'Artistes* was represented at the Théâtre Libre in Paris; two years later he won even greater success with *Blanchette* at the same theatre. Since then he has produced several plays, mostly dealing with some social injustice or abuse, some of which have been interdicted by the authorities. Brieux's characters are drawn with power and dramatic effect. Among his latest pieces are *Les Bienfaiteurs* (1896); *L'Évasion* (Comédie Française, 1896); *Les Remplaçantes* (1901); *Les Avariés* (1901); *La Robe Rouge* (1900), produced at the Garrick Theatre, London (1904), as *The Arm of the Law*, which called attention to abuses (now altered) connected with the preliminary inquiry of the *juge d'instruction*, and stirred up a violent controversy; *Petite Amie* (1902); *La Couvée* (1904); *Maternité* (1904); *L'Armature* (1905); *Les Hannelons* (1906); *La Française* (1907); and *Simone* (1908).

Brig, a sailing vessel with two masts, both square-rigged. A *brigantine* or *hermaphrodite brig* has also two masts, but the square sails

on the foremast only, the mainmast being fore-and-aft rigged.

Brig. See BRIEG.

Brigade, a number of military units assembled for convenience of supply and tactical control. A cavalry brigade consists of headquarters and 3 regiments, or 80 officers, 1,617 men, 1,805 horses, and 58 vehicles. A mounted brigade consists of headquarters, 2 or 1 cavalry regiments, 1 or 2 mounted infantry battalions, a horseartillery battery, an ammunition column, a transport and supply column, and a cavalry field ambulance. Its strength is, in either case, about 100 officers, 2,200 men, 2,360 horses, and 120 vehicles. By reason of its infantry, a mounted brigade is capable of especially tenacious resistance. It thus forms a solid *point d'appui* for a cavalry division. It is usually employed as protective cavalry (see CAVALRY). An infantry brigade consists of headquarters and 4 battalions, or 120 officers, 4,023 men, 311 horses, and 67 vehicles. An artillery brigade consists of headquarters and 2 batteries of horse artillery, or 3 batteries of Q.F. field or howitzer artillery; in each case with an ammunition column. (See AMMUNITION SUPPLY.) It will be noticed that cavalry and infantry brigades are not provided with supply and medical services. The reason is that their respective divisions possess sufficient to equip them should it be necessary to detach them. See DIVISION.

Brigade-major, the staff officer of the officer commanding a cavalry or infantry brigade; as a rule, a captain or major. His chief duty lies in drafting and issuing the brigadier's orders to the various commanding officers in the brigade, and he is responsible for the safe delivery of these orders. Much of his work is necessarily in the office in time of peace. On manœuvres and active

service, besides the drafting, etc., of orders, his duties include the arrangement of many details of administration.

Brigadier-general, the temporary or local rank granted to a colonel on his appointment to the command of a cavalry or infantry brigade or of the artillery of a division. He directs all brigade operations, but, within reasonable limits, gives the officers commanding his units a free hand in the training of their commands.

Brigandine (Low Lat. *brigans*, 'a light-armed soldier'), a medieval (15th-16th century) coat of mail composed of light, thin, jointed scales, or a coat of thin, pliant plate armour. The term is also applied to a jacket quilted with iron, worn by archers in the reigns of Elizabeth and James I.

Brigands, or **BANDITTI**, organized bands who practise robbery, making their headquarters in fastnesses in forests or mountains. Brigandage had its origin in Greece and Italy, and soon spread to France and Germany. Perhaps the most noted brigand in history was Fra Diavolo, who played an important part in the revolution of Naples in 1799, and was received with extraordinary favour at the court of Queen Caroline. Spain, also, has been one of the happy hunting-grounds of the brigand, and in that country, as in Italy, popular sympathy has been frequently extended to the robbers rather than the robbed. Sicilian, Turkish, and Bulgarian brigands are now the most notorious. The most recent case of note was the seizure of Miss Stone, an American missionary, and Mrs. Tsilka, a Bulgarian nurse, who were captured by Macedonian brigands on Sept. 3, 1901, and kept for six months, when they were released on the payment by the American government of a ransom of 25,000 Turk-

ish pounds. See Sir R. Church's *Chapters in an Adventurous Life in Italy and Greece* (1895). E. About's *Le Roi des Montagnes*, Moens's *English Travellers and Italian Brigands* (1866), and Macfarlane's *Lives and Exploits of Banditti* (1837).

Brigantine. See **BRIG**.

Briggs, CHARLES AUGUSTUS (1841), American theologian, was born in New York city. He was ordained (1870) minister of the Presbyterian church at Roselle, New Jersey; in 1874 became professor of Hebrew at Union Theological Seminary, and professor of Biblical theology, 1891-1904. In 1893 he was suspended for heresy. His works include *American Presbyterianism* (1885), *The Messianic Prophecy* (1886), *The Higher Criticism of the Hexateuch* (1893), *The Messiah of the Gospels* (1894), *New Light on the Life of Jesus* (1904), *Commentary on the Psalms* (1904-7), *Church Unity* (1909), etc.

Briggs, HENRY (1561-1630), English mathematician, was professor of geometry at Gresham College, London (1596-1619), and Savilian professor of astronomy at Oxford, in succession to the founder, Sir Henry Savile. He was among the first to recognize the importance of Napier's discovery of logarithms, and originated the use of the number 10 as the base for tables. Chief works: *Arithmetica Logarithmica* (1624); *Trigonometrica Britannica* (1633).

Brighella, a personage in the Italian popular comedy. He is represented as a servant who is always ready to lie, to play tricks, and plot, but leaves the execution of his plots to Arlecchino, another comic character. His livery is white, with green trimmings.

Brighthouse, munic. bor., incorporated in 1893 with Brighthouse Rastrick and Hove Edge, on the

riv. Calder, W. Riding, Yorkshire, England, 3 m. s.e. of Halifax, with stn. on L. & Y.R. It has woollen and cotton factories, silk and wire works, flour mills, and flagstone quarries. Pop. 23,000.

Bright, Sir Charles Tilston (1832-88), English telegraph engineer, was born at Wanstead, in Essex. As engineer of the Magnetic Company (1852-60) he erected lines in various parts of Great Britain, and laid (1853) the first deep-water cable between Portpatrick, Scotland, and Donaghadee, Ireland. His experiments in long-distance electric signalling resulted in the formation, with Brett and Cyrus Field, of the Atlantic Cable Company, of which Bright was appointed engineer. The first cable (1857-58), after working sixty-eight days, proved a failure. Bright subsequently laid cables in the Mediterranean, the Persian Gulf (1864), and the W. Indies (1871). He was knighted in 1858, and from 1865 to 1868 represented Greenwich in Parliament. See *Life* by his brother, E. B. Bright, and his son, Charles Bright (1898).

Bright, John (1811-89), English orator and statesman, the son of Jacob Bright, a Quaker cotton spinner, was born at Greenbank, near Rochdale, in Lancashire. His friendship with Richard Cobden began over the question of national education; but it was in 1839 that they were drawn closely together, on the formation of the National Anti-Corn-Law League, when Bright began to devote himself heart and soul to the movement for the repeal of the Corn Laws, and from this time forward was the most eloquent advocate of the cause. In 1843 he was returned to the House of Commons for the city of Durham, and speedily made his mark; and at length, in 1846, Sir Robert Peel's measure for repealing the ob-

noxious laws was carried. Bright incurred much unpopularity for his resistance to Lord Ashley's factory legislation; he held that workmen and employers should be left free to regulate their mutual relations. In 1847 he was returned for Manchester, and again in 1852. He advocated remedial legislation for Ireland, including disestablishment of the church, free trade in land, and a liberal policy towards India.

The Crimean war found a strong opponent in Bright, and some of his finest speeches in Parliament were delivered in connection with this subject—*e.g.* that on Feb. 23, 1855. At the spring election of 1857 he lost his seat for Manchester, owing to his attitude on China and the Crimean war; but in the following August he was returned for Birmingham, and he ever afterwards remained one of its representatives.

Bright supported the bill (1858) carried by Lord Derby's government for the abolition of the E. India Company and the transfer of the government of India to the crown. In 1859-60 he was one of the principal leaders in the great reform agitation; and when the civil war broke out in the United States he ardently supported the cause of the North, though his own trade was most seriously affected by the continuance of the war. The Russell-Gladstone Reform Bill of 1866 he also supported, and when it was defeated by a combination of discontented Liberals ('Adullamites') and the Tories, he took the foremost part in the reform campaign in London, Birmingham, Leeds, Edinburgh, and Glasgow.

When Gladstone came into office in 1868, Bright accepted the presidency of the Board of Trade. He gave powerful support at all stages to the Irish Church Disestablishment Act, the Irish Land Act, and the Elementary Educa-

tion Act. Resigning office in December 1870, in consequence of ill-health, he did not appear again in Parliament until April 1872. He was appointed Chancellor of the Duchy of Lancaster in August 1873, and held this office until the resignation of the Gladstone ministry in February 1874. In 1879 he declined an invitation from President Hayes to visit the United States, where he was held in high honour. When the Liberals returned to office in May 1880, Bright again became Chancellor of the Duchy of Lancaster; but he retired from the cabinet in 1882, on the ground that he could not support the policy of his colleagues in Egypt—a policy which led to the bombardment of Alexandria. When Gladstone introduced the Home Rule Bill for Ireland in 1886, Bright separated himself with pain from his old leader and attached himself to the Liberal-Unionist party. From May 1888 Bright suffered almost continuously from illness until his death, on March 27, 1889. He was a strong, manly Englishman, fearless but just in his political contests, and with a power of simple, nervous eloquence which placed him in the front rank of parliamentary orators. See Bright's *Life and Speeches*, by G. Barnett Smith (2 vols. 1881); Robertson's *Life* (new ed. 1884); *Speeches* (published in 1866 and 1868); *Public Letters* (ed. by H. J. Leech, 1895); Vince's *John Bright* (1897); and *John Bright: A Monograph*, by R. Barry O'Brien (1910). A biography of Bright, by Mr. G. M. Trevelyan, is now in preparation.

Bright, RICHARD (1789-1853), English physician, was born at Bristol, and received his medical education in Edinburgh and London. In 1820 he settled in London. His *Reports of Medical Cases* (1827), studies in morbid anatomy, contain the first statement of the

association of general dropsy and albuminuria with a morbid condition of the kidneys, and the name 'Bright's disease' has been given to non-suppurative nephritis. He was physician-extraordinary to Queen Victoria (1837).

Bright, TIMOTHY (?1551-1615), English inventor of shorthand, was presented by Queen Elizabeth to the livings of Methley (1591) and Barwick-in-Elmet (1594), both in Yorkshire. His *Treatise of Melancholie* (1586) is credited with having suggested Burton's *Anatomy*. Bright's *Characterie*, a method of 'short, swift, and secret writing' (1588), is only partly alphabetical, and therefore vastly inferior to Willis's *Stenography* (1602), which is the real forerunner of the modern systems. See *Shorthand*, May 1884; J. H. Lewis's *Hist. of Shorthand* (1815).

Bright, WILLIAM (1824-1901), canon of Christ Church, Oxford, born at Doncaster; theological tutor in Trinity College, Glynalmond (1850-9), and tutor of University College, Oxford (1859-68), when he was made regius professor of ecclesiastical history at Oxford, and canon of Christ Church. Canon Bright was a voluminous writer, his works including *Ancient Collects and Prayers* (1857), *Hist. of the Church* (1860), *Faith and Life* (1864), *Chapters of Early Eng. Church Hist.* (1878), and *Iona and other Verses* (1895). He also edited Eusebius's *Eccles. Hist.* (1872), St. Athanasius's *Against the Arians* (1873) and *Historical Writings* (1878), and St. Augustine's *Anti-Pelagian Treatises* (1880).

Brightlingsea, par. and seapt., Essex, England, on the estuary of the Colne, 10 m. s.e. of Colchester. Fishing and boat-building. Yacht crews are largely drawn from Brightlingsea and neighbouring villages. Pop. 4,500.

Brighton, formerly **BRIGHT-HELMSTONE**, parl. (1832), munic. (1854), co. bor. (1888), and wat.-pl., Sussex, England, on English Channel, 50 m. s.e. of London, on L.B. & S.C.R. Brighton's great popularity as a fashionable resort arose from the writings of Dr. Russell in the 18th century, the discovery of a chalybeate spring, the residence of George IV., and the facilities afforded to Londoners, especially by the opening in 1841 of the L.B. & S.C.Ry. The corporation has constructed a massive sea front 3 m. long (protected against the sea by a system of groynes), the West Pier (1,115 ft.), and the New Pier (1,700 ft.). The old Chain Pier was washed away in 1896. The Royal Pavilion, a fine though bizarre structure of Oriental aspect, now the property of the corporation, was acquired in 1849 from the crown at a cost of £53,000. The Dome, formerly the royal stables, is now an assembly room accommodating 3,000 people. In connection with this property there are pleasure grounds, a library, a reading room, an art gallery, and a museum. Among other fine parks are the Preston (72 ac.) and the Queen's (17 ac.), presented to the corporation by the race stand trustees. There are well-equipped public baths; and the Aquarium, purchased in 1901, is the property of the corporation.

The munic. bor. of **HOVE**, or **W. Brighton** (1,694 ac.; pop. 38,000), adjoins Brighton, and the par. of Hove forms part of the parl. bor. Preston, to the N., has since 1873 been included in the munic. and parl. bor. of Brighton.

Brighton has always been connected with the fishing industry, and its boats still bring in large numbers of herring and mackerel. Pop. 130,000. See Sicklemore's *History of Brighton* (1827), and Melville's *Brighton* (1909).

Brighton, tn. and wat.-pl., Bourke co., Victoria, Australia, on Port Philip Bay, 8 m. s.e. of Melbourne. Pop. 10,000.

Bright's Disease. See NEPHRITIS.

Brigit, **BRIDGET**, or **BRIDE**, ST. (453-523), of Kildare, founded the church of Kildare. Her day is February 1. From the frequent references to fire in her history, it has been suggested that the saint has been partly confounded with Brigit, the old goddess of smiths. See Todd's *St. Patrick* (1844).

Brignoles, dist. tn., dep. Var, France, 36 m. by rail N.N.E. of Toulon, with mineral springs, marble quarry, and some trade in olives, wines, and fruits. It occupies a beautiful situation at an altitude of 750 ft. Pop. 4,400.

Brigue. See BRIEG.

Bril, **MATTIJS** (1550-84), Flemish painter, born in Antwerp, went while a youth to Rome, where he executed frescoes at the Vatican for Pope Gregory XIII. His *Jesus Healing the Paralytic* is in the Naples Museum, and his *Virgin* and *The Infant Jesus and the Two Angels* are in the Dresden Gallery.

Bril, **PAULUS** (1554-1626), the earliest of the great 17th century Flemish landscape painters. He went to Rome with his brother Mattijs, and created a style at once grand, simple, and poetic. Annibale Carracci occasionally painted the figures in his pictures. His works include *Martyrdom of St. Clement* (Vatican), and landscapes in most European galleries. See F. T. Kugler's *Handbook of Painting: German, Flemish, and Dutch Schools* (1879).

Brill, a fish belonging to the same genus (*Rhombus*) as the turbot, from which it is distinguished by its smooth skin, smaller size, and glistening spots. It is widely distributed in the seas of Europe, but is less prized than the turbot.

Brillat-Savarin, ANTHELME (1755-1826), French writer and magistrate, born at Belley, is known by his *Physiologie du Gout* (1825; Eng. trans. 1884, as *A Handbook of Gastronomy*), the code of gastronomers, written in a humorous vein. He resided in Switzerland and America (1793-96), and after his return became a member of the Court of Cassation.

Brilon, tn., dist. Arnsberg, prov. Westphalia, Prussia, 27 m. N. of Arnsberg; has calamine, lead, and iron mines, and makes tobacco pipes. It was for some time capital of Westphalia. Pop. 5,000.

Brimstone. See SULPHUR.

Brin, BENEDETTO (1833-98), an Italian naval engineer and administrator, was born at Turin, and after service as an engineer in the navy, he was appointed under-secretary of state to the Italian minister of marine in 1873. In 1876 he was promoted to be minister of marine, an office he held with short interruptions down to 1891, and during that time distinguished himself by the rapid manner in which he developed the Italian navy, especially by the construction of the armoured cruisers *Dandolo*, 12,265 tons (built 1878, reconstructed 1897), and the *Italia*, 15,654 tons (built 1880), both designed by himself, and the establishment of shipyards and shops for the construction of engines and munitions of war. In 1892 Brin became minister for foreign affairs, but in 1896 returned to his old position as minister of marine.

Brinckman, JOHN (1814-70), writer in Low German (Platt-Deutsch), was a schoolmaster most of his life, and wrote popular stories—e.g. *Kaspar Ohm un ik* (1854—the best edition), *Peter Lorenz bi Abukir* (1868), and *Unser Hergot up Reisen* (1869)—and a volume of poems, *Vagel Grip*

(1859). See *Life* by W. S. (1900).

Brindaban, or BINDRABAN, munic. tn. on the r. bk. of the Jumna, 6 m. N. of Muttra, United Provs., India; one of the holy cities of the Hindus, visited by large numbers of pilgrims. Pop. 22,000.

Brindisi (anc. *Brundisium*), seapt. tn. and archiepisc. see, prov. Lecce, Italy, the only really good harbour between Venice and the S.E. extremity of Italy, stands on the Adriatic, 472 m. by rail S.E. of Bologna. It acquired renewed importance after the opening of the Suez Canal, as the land terminus of the 'overland' route to India. But in 1898 the P. & O. main line steamers made Marsailles their base instead of Brindisi, though a branch line of boats for the mails still runs from the last named to Port Said. Brindisi is also the shipping port for mails to Turkey, Greece, and Albania. The harbour encloses the town with two arms, and is reached by a channel from the outer harbour, which is itself sheltered by some small islands. Vessels of 525 to 550 ft., drawing 25 ft., can now enter and turn without hindrance. The trade aggregates nearly a million sterling annually, and is about equally divided between exports (chiefly figs, wine, olive oil, coral, and silk) and imports (mostly coal). This town was an important shipping centre under the Romans, when, being the sea terminus of the Appian Way, it was the chief port for Greece (Dyrrhachium was only 70 m. distant across the Adriatic); and again in the period of the crusades. The town has a cathedral, rebuilt in 1160; a castle, built by the Emperor Frederick II., and now used as a prison; and a museum, in the ancient 11th-century baptistery of St. John. Here the Roman poet Pacuvius was born, and here

the poet Virgil died in 19 B.C. The town was besieged by Cæsar in 49 B.C., was destroyed by King Louis of Hungary in 1348, and suffered from an earthquake in 1458. Pop. 25,000.

Brindley, JAMES (1716-72), English engineer, planned (1758) a canal from Worsley to Manchester for the Duke of Bridgewater, from which dates the commencement of English inland navigation. In all he superintended the construction of over 365 miles of canal, the most important being the Grand Trunk, between the Trent and the Mersey. See Smiles's *Lives of the Engineers*, vol. i. (new ed. 1874).

Brine-shrimps (*Artemia*), small crustaceans found in the water of salt lakes, and of interest because the naturalist Schimke-witsch succeeded in transforming one so-called species into another by altering the salinity of the water. For discussions of the significance of the experiment, see *Darwinism*, by A. R. Wallace (1889), and *Materials for the Study of Variation*, by W. J. Bateson (1894).

Brink, BERNARD TEN (1841-92), philologist, born at Amsterdam, and died at Strassburg. He was successively professor of modern languages at Marburg (1870) and at Strassburg (1873), and specially distinguished himself as a student of English literature. His principal books were *Geschichte der Englischen Literatur* (1877-93; Eng. trans. 1883), and studies of Chaucer (2 vols. 1870 and 1884), Beowulf (1888), and Shakespeare (1893).

Brink, JAN TEN (1834-1901), Dutch critic and novelist, born at Appingadam; taught for a time (1860) at Batavia, Java, then (1862) at the Hague, and in 1884 became professor of Dutch literature at Leyden. In the field of criticism he wrote (in Dutch) *History of North Dutch Letters*

in the 19th Century (new ed. 1902); *Talks about Modern Novels* (1884); studies of Bulwer Lytton (1873), Zola (1879), etc. Of his novels it may suffice to mention *Het verloren Kind* (1879), *De Schoonzoon van Mevrouw de Roggeveen* (1872-73), and *De Brederos* (1891). His *Literary Sketches* (Dutch) were collected in 17 vols. in 1882-8, and his *Novels* in 13 vols. in 1885.

Brin villiers, MARIE MADE-LEINE DREUX D'AUBRAY, MAR-QUISE DE (c. 1630-76), French poisoner, was married to the Marquis de Brin villiers in 1651. Conceiving a passion for a young officer, Jean Baptiste Sainte-Croix, and having learned from him the secrets of poisoning, she in 1670 poisoned her father, two brothers, and sisters. Her guilt was discovered on the sudden death of Sainte-Croix (1672). She fled, but was arrested in a convent at Liège, and beheaded and burned at Paris, July 16, 1676. See Bauplein's *La Marquise de Brin villiers* (1871), *Lettres of Madame de Sévigné* (1818-19); Funck-Brentano's *Le Drame des Poisons* (4th ed. 1900); and Roullier's *La Marquise de Brin-villiers* (1883).

Brionian Islands, in the Adriatic, opposite to the harbour of Pola in Istria, belong to Austria. Here are the sandstone quarries whence the stone was obtained for building the palaces of Venice. Here, too, the Genoese defeated the Venetians in a naval battle in 1379.

Brionde, tn., dep. of Haute-Loire, France, 30 m. by rail N.W. of Le Puy, near riv. Allier; has an interesting church, founded in 4th century, and finished in 11th and 13th centuries. Trades in wine and corn. Pop. 4,800.

Briquette, a fuel composed of coal-dust incorporated with pitch, tar, asphalt, or other combustible cementing material. The dust is

washed, dried, and mixed with pitch in a disintegrator. The mixture is then introduced into a pugmill, in which the pitch is rendered viscid by steam; it is pressed into moulds, and allowed to cool. Briquettes are usually made in two sizes, about 10 lbs. and about 5. Other substances, such as peat, charcoal, and coke, have been used in the making of briquettes. Their heating power, however, is not equal to that of good coal, and they leave a large amount of ash. Certain kinds of iron ore have to be briquetted for smelting in the blast furnace.

Brisbane, cap. of Queensland, Australia, at the S.E. corner, about 500 m. N. of Sydney, on river of same name, 25 m. from its mouth in Moreton Bay. It is built on a series of hills, but some parts are low-lying, and have been the scene of disastrous floods. The river is navigable up to the city for ocean-going steamers. Canadian-Australian mail-boats running monthly between Sydney and Vancouver call (Brisbane to Vancouver, 20 days); the British India Line (London and Brisbane *via* Torres Straits) dispatches steamers at intervals. Mean temp.: summer, 75°2'; winter, 64°3'. Rain-fall: average for ten years, 58 in. Among the prominent buildings are the Houses of Parliament, the Treasury Buildings, the Custom House, the General Post Office, and the R.C. Cathedral. There are fine botanic gardens, and numerous parks. Brisbane is a great trading and manufacturing centre. Preserved and frozen meats, hides and skins, wool, tallow, and pastoral produce, are the chief exports; cereals, hardware, and soft goods are the principal imports. Brisbane was founded in 1825 as a penal settlement, and was named after the then governor of New South Wales.

In 1859 it was made the capital of Queensland. South Brisbane became a separate city in 1903. Pop. 30,000; including S. Brisbane and suburbs, 140,000.

SOUTH BRISBANE lies on the south side of the Brisbane R. It has an important shipping trade, and has a dry dock which can accommodate vessels up to 420 ft. in length. Pop. 26,000.

Brisbane, SIR CHARLES (?1769-1829), British rear-admiral, was a midshipman at the battle of Dominica (1782). In 1793 he was present at the occupation of Toulon, and in 1794 at the operations under Nelson in Corsica. In command of the *Arethusa*, in company with the *Anson*, he fought and destroyed the *Pomona* and several gunboats under the guns of Havana (1806). Brisbane was severely wounded. In 1807 he carried out his finest exploit—the capture of Curaçao and several Dutch vessels with a force of four frigates only. He received a K.C.B. in 1815, and attained the rank of rear-admiral in 1819.

Brisbane, SIR JAMES (1774-1826), British naval officer, a younger brother of Sir Charles Brisbane, was a midshipman in the *Queen Charlotte* at the battle of 'the glorious First of June,' 1794. In 1809, in the *Belle Poule*, he captured the *Var* under the batteries of Valona, and in 1816 commanded Lord Exmouth's flagship, the *Queen Charlotte*, at the bombardment of Algiers, and was knighted. In the first Burmese war (1825) he commanded the naval forces.

Brisbane, SIR T. MAKDOUGALL (1773-1860), astronomer and colonial governor, served in Flanders, W. Indies, and the Peninsula. Appointed governor of New South Wales (1821), he gave a rather unwise encouragement to indiscriminate immigration, and was recalled in 1825 in consequence of the confusion in the affairs of the

colony. Brisbane founded three observatories—one at Brisbane, near Largs, and one at Makerstoun, both in Scotland, and one at Parramatta, near Sydney, Australia, where important work was done in cataloguing the stars of the southern hemisphere.

Briseis, daughter of Briseus of Lyrnessus, was taken captive by Achilles during the siege of Troy. When Agamemnon had to give up Chryseis to her father Chryses, he took Briseis from Achilles; hence 'the wrath' of Achilles referred to in the *Iliad*.

Brisighella, tn., Italy, prov. of and 25 m. s.w. of Ravenna; has mineral springs. Pop. (comm.) 14,000.

Brisson, EUGÈNE HENRI (1835), French politician, born at Bourges, and studied law at Paris. He was deputy mayor of Paris (1870); vice-president of the Assembly (1879), and president (1881); prime minister (1885), and an unsuccessful candidate for the presidency (1894 and 1895). He was again president of the Chamber (1894-98), and premier (June-Oct. 1898). It was mainly owing to his initiative that the revision of the Dreyfus case was undertaken. In 1906 he was once more elected president of the Chamber of Deputies.

Brissot, JACQUES PIERRE (1754-93), French revolutionist, was born near Chartres. He was trained for the law, but turned to journalism and authorship, and in 1780 published *Théorie des Lois Criminelles*, and in 1782-6 *Philosophique du Législateur*. He was imprisoned for four months in the Bastille for publishing the pamphlet *Le Diable dans un Bénédictin* (1784), directed against the ministry. After a journey to America he was elected to the National Assembly. Brissot established *Le Patriote Français*, and became head of the Girondist party, who were also at first

named Brissotins. Their leader warmly advocated the spread of republican principles in Europe, was in favour of war against Austria and Britain, and had much to do with the downfall of the monarchy. But opposing the trial and condemnation of the king, he incurred the enmity of Robespierre, and was arrested in June 1793, and in October following perished on the scaffold, with twenty of his Girondist friends. He was a man of singularly honest and disinterested character, virtuous, and eloquent. His *Mémoires* were edited by his son in 4 vols. (1830-2). See also Carlyle's *French Revolution*.

Bristol. (1.) Co. bor. and city, once the second town in England, stands on the river Avon, at the borders of Gloucestershire and Somerset, and on the G.W. and Mid. Rys. There are plentiful traces of British and Roman occupation, and silver pennies were struck here (978-1016) in the reign of Ethelred the Unready. The town was early infamous as a slave market. Yielding easily at the conquest, it was fortified by Bishop Geoffrey of Coutances, its castle surviving till 1665. Notable events are the insurrection of 1313-14; the Black Death in 1349; the sailing of John Cabot in 1497, on the voyage that resulted in the discovery of the mainland of N. America; the two sieges during the civil war; the 'Bridge' riots of 1793; the opening of docks in 1809; the serious reform riots of 1831; the sailing of the *Great Western* in 1838; and the opening of the new Avonmouth Dock in 1908. The new dock (constructed by Sir John Aird and Co. at a cost of £1,394,512) has a water area of 30 acres, and a high-water ordinary neap-tide depth of 25 ft. There are four dry-docks. The see of Bristol, originally distinct, was joined to that of Gloucester in 1836, but

separated again in 1897. Its cathedral retains the site and part of the building of an Augustinian monastery founded by Robert Fitzharding, who began the erection of the abbey in 1142. The present nave and west towers were completed in 1888. Even more beautiful is St. Mary Redcliffe church, and there are many other fine old churches. Other important buildings are the Colston hall, the hospital and infirmary, the two theatres, the museum, art gallery, university (incorporated in 1909), Clifton grammar school, Merchant Venturers' schools, Müller's orphanages on Ashley Down. There are many parks. The annual value of the exports exceeds 2½ millions, and of the imports 12 millions sterling. In 1909 shipping of 2,057,276 tonnage entered the port. Imports from Canada and Jamaica are particularly large. Much trade is done in cotton, cocoa, boots, corrugated iron, chemicals, timber, wool, and Irish provisions. Chatterton and Southey were born here. The city has returned four M.P.'s since 1885. Pop. 380,000. See Corry and Evans's *Bristol* (1816); Nicholl and Taylor's *Bristol, Past and Present* (1881); Hunt's *Bristol* (1887); Bickley's *The Little Red Book of Bristol* (1904); Harvey's *Bristol* (1906); and Stone's *Bristol* (1909). (2.) Town, Sullivan co., Tennessee, and a city in Washington co., Virginia, U.S.A., 260 m. E. by N. of Nashville. While entirely independent in organization, these two places form one body of population, the boundary line between the states traversing the main street. It is the seat of King (1867) and Sullins (1869) Colleges and S.W. Virginia Institute (1884). Manufactures include flour, lumber, and tobacco. Pop. 10,000. (3.) Borough, Bucks co., Pennsylvania, U.S.A., 20 m. N.E. of Philadelphia, on Delaware R., and at terminus of Delaware

Canal; manufactures cotton and woollen goods, carpets, and hosiery. Pop. 7,000. (4.) Port of entry and cap. of Bristol co., Rhode I., on E. shore of Narragansett Bay, 12 m. S.S.E. of Providence; has a good harbour, and a shipyard famous for yacht-building; also rubber works and cotton mills. The locality is believed to have been visited by Norsemen about 1000 A.D. and to be referred to in Icelandic sagas. Pop. 8,000. See Munro's *History of Bristol* (1880). (5.) Town, Connecticut, U.S.A., co. of and 16 m. S.W. of Hartford; has foundries, machine shops, and engine works. Pop. 10,000.

Bristol Channel, an arm of the Atlantic Ocean, on W. coast of England, separating S. Wales from Devon and Somerset, and extending from the mouth of the Severn to St. George's Channel (80 m.). It includes the bays of Carmarthen and Swansea on the north, and Bridgwater, Minhead, Porlock, Ilfracombe, and Barnstaple on the south. It receives the rivers Towy, Taff, Usk, Wye, Severn, Avon, Parret, Tone, Taw, and Torridge. The coast-line is over 200 m. in length, and is very irregular. Lundy I. stands at the entrance to the Channel. The Channel is remarkable for its high tides, which at Bristol rise to 35 ft., Swansea 27 ft., and Newport 38 ft. The rapid inflowing tides, meeting the out-flowing Severn, give rise to 'bores.'

Britain. Camden gives the derivation from the Celtic *brith* or *brit*, meaning 'painted.' A more probable conjecture is that the Phenicians, who first discovered the islands Albion (England and Scotland) and Ierne (Ireland), named them the land of tin—*Bratannac*—the word gradually becoming softened, through the Greeks and Romans, to *Britannice* and *Britannia*. Professor

Rhys suggests that 'Britain' is derived from the Celtic *brethyn*, 'cloth'—the inhabitants being 'cloth-clad,' while the Celts wore skins. It was not until their occupation by the Romans that the word Britannia came into use as a name for the British Islands, the divisions being *Britannia Romana* and *Britannia Barbaram*. Severus (beginning of 3rd century) divided Britain into two provinces, *Britannia Superior* and *Britannia Inferior*. The name Great Britain was applied to England, Wales, and Scotland on the accession of James I. in 1603, although the expression had been used for a considerable time to distinguish England, Wales, and Scotland from Britannia Minor—viz. Bretagne or Brittany, in France. On Jan. 1, 1801, when the legislative union of Great Britain and Ireland took place, the name adopted was the 'United Kingdom of Great Britain and Ireland.' For history and geography see ENGLAND, SCOTLAND, IRELAND, WALES.

Britannia, the British 121-gun stationary ship (6,201 tons) launched as the *Prince of Wales* in 1860, subsequently renamed after an older vessel, and fitted as a training-ship for naval cadets. It then gave its name to the whole training establishment at Dartmouth. There have been ships of the name in the navy since 1682, and they are associated with the battles of Barfleur and La Hogue (1692), Toulon (1793), Hotham's actions off Genoa and Hyères (1795), the battle of Cape St. Vincent (1797), of Trafalgar (1805), and the bombardment of Sebastopol (1854). A *Britannia* was first made a training-school for naval cadets in 1859. It was then stationed at Portsmouth. The *Britannia* is now superseded by the Royal Naval College, erected on the bank of the Dart. A new *Britannia* first-class battle-

ship, 16,350 tons, was launched at Portsmouth, Dec. 10, 1904.

Britannia Metal, an alloy consisting of eighty to ninety parts of tin, ten to twenty of antimony, and sometimes small quantities of copper, zinc, lead, or bismuth. It is harder than tin, takes a good polish, and is capable of being silver-plated. The metal may be cast or worked into vessels of the required shape by pressing and rolling, and articles made of it acquire a metallic ring by heating in oil to the temperature at which the metal fuses. It is used for making spoons and teapots.

Britannia Tubular Bridge. See BRIDGE.

Britannicus (42-55 A.D.), son of the Emperor Claudius and Messalina, obtained his name from the victories which his father was held to have won in Britain. After the degradation of his mother, Agrippina, Claudius's second wife, prevailed on Claudius to make her son Nero his heir. After Nero's accession his mother tried to make use of Britannicus as an instrument to work on Nero's fear, threatening to uphold him as the lawful heir; so Nero had him poisoned in 55 A.D.

British Academy. See ACAD-EMY.

British and African Steam Navigation Company (1900) Ltd. This company was originally established in 1858, to run a line of steamers carrying passengers between Glasgow, Liverpool, and the west coast of Africa. In 1900 the company acquired an additional fleet of steamers from Messrs. Elder, Dempster, and Co.; and a new company was formed, with a capital of £1,000,000, Sir A. L. Jones being chairman. The company owns a fleet of 41 steamers, aggregating 108,603 tons. In conjunction with the African Steamship Co. a regular service of steamers is

maintained from Liverpool, Hamburg, and Rotterdam, to W. Africa. London offices: 4 St. Mary Axe.

British and Foreign Anti-Slavery Society, founded 1839, under presidency of Thomas Clarkson, with the object of promoting the universal extinction of slavery and the slave trade, and the protection of the enfranchised population in the British possessions, and of all persons captured as slaves. It publishes the *Anti-Slavery Reporter*, and has its office at 51 Denison House, Vauxhall Bridge Road, London, S.W. Secretary, Travers Buxton.

British and Foreign Bible Society. See BIBLE SOCIETIES.

British and South American Steam Navigation Company, Ltd., managed by Messrs. R. P. Houston & Co. (estab. 1883), conducts a cargo service between London, Liverpool, New York, and the River Plate and S. Africa. It possesses 23 steamers, aggregating 87,838 tons. London offices: 16 Leadenhall Street, E.C.

British Association, the chief scientific association in Britain. Its formal designation is 'The British Association for the Advancement of Science.' The first meeting was held in York, on Sept. 27, 1831. Sir David Brewster was the practical founder of the association, which now numbers nearly five thousand members. Nearly half that number attend the annual meetings, which are held, on invitation, in various towns (London excepted) in the United Kingdom, though the association has also travelled to Canada and to S. Africa. It is divided into the following sections: *A.* Mathematics and Physics; *B.* Chemistry; *C.* Geology; *D.* Zoology; *E.* Geography; *F.* Economic Science and Statistics; *G.* Engineering; *H.* Anthro-

pology; *I.* Physiology; *K.* Botany; *L.* Educational Science—some sections being subdivided into departments. A volume is published in connection with each meeting, giving the reports, addresses, and papers which are submitted to the members. A large income yields a surplus, which is devoted to grants—£1,000 to £2,000 annually—for special researches conducted by committees of the association.

British Astronomical Association, founded in October 1890 to encourage popular interest in astronomy, to associate and organize amateur observers, and to circulate current astronomical information. The association numbers more than a thousand members, and has twelve 'observing sections.' Secretaries—Major F. L. Grant, F.R.A.S., and J. A. Hardcastle, F.R.A.S.; office, 85 Gracechurch Street, London, E.C. There are branches in Glasgow, Sydney, and Melbourne.

British Central Africa, a vast territory under British protection in S. Central Africa, most of which is under the administration of the British S. Africa Company, and is officially known as N.E. and N.W. RHODESIA (see RHODESIA); the remainder, under direct imperial control, comprises the eastern part, and is known as the NYASALAND PROTECTORATE (formerly the BRITISH CENTRAL AFRICA PROTECTORATE). The boundaries of British Central Africa have been settled by the Anglo-Portuguese agreement of 1899-1900. In physical configuration British Central Africa is a vast plateau, flanked on the E. by Lake Nyasa, and pitted by numerous other great lakes, the most important (wholly or in part within the British sphere of influence) being Tanganyika, Bangweolo, Mworu, Moir Lake, the Mweru Salt Swamp, and Lake Kampolomba. The principal rivers

are either affluents of the Zambezi (the Shire, Kafue, Loangwa, Kabompo) or of the Congo (the Chambezi, Luapula). The whole table-land is 'tortured into lumps and ridges and tilts, which are styled mountains,' the highest known elevation being the volcanic Mlanje (9,683 ft.), south of Lake Chilwa. On the western versant of Lake Nyasa the table-land occasionally reaches 7,000 to 8,000 ft. The river valleys are covered with alluvium; and minerals are plentiful, especially iron, copper, and coal (in the sandstone formations). The highlands are fairly healthy, but the low-lying parts are infested by the tsetse fly. Average rainfall, about 40 in. The flora is fairly abundant, and in places becomes tropically luxuriant, with nearly all the characteristic plants and trees of tropical Africa. The fauna includes some W. African species, but lacks the ostrich, oryx antelope, the aard wolf, the zebra, and the secretary bird, all characteristic of S. Africa. Antelopes are abundant; the elephant and rhinoceros are still found.

The natives speak Bantu languages, and seem to be a fusion of the east coast negro, the west coast negro, and the Bushman. The Angoni, the ruling caste between Lake Nyasa and the Loangwa, are akin to the Matabele. The dominant people of Nyasaland, however, are the fine race of the Yao, invaders from the east. The important Barotse, under their enlightened king Lewanika, in the west, are connected by language with the Lower Guinea and Congo basin peoples. The entire native population does not exceed three millions.

British protection was extended to this area, originally opened up by Livingstone, between 1890 and 1891. N. Rhodesia, now that the Arab slave-raiders are sup-

pressed, and the territory is traversed by the trans-continental telegraph, has a chance of steady development. It is a field of active missionary enterprise. Area, about 120,000 sq. m. The chief towns within the protectorate are Fort Jameson (administrative centre), Fife, Abercorn, and Kituta. The NYASALAND PROTECTORATE (until 1907 the *British Central Africa Protectorate*) and comprises the eastern portion of British Central Africa, is administered by a governor, assisted by an executive and legislative council. It is divided into thirteen districts, and has an area of 40,000 sq. m., and a population of about 1,000,000, of whom about 600 are Europeans. The exports are valued at £125,000, and the imports at £140,000 per annum. The chief articles of export are coffee, cotton, rubber, strophanthus, ivory, beeswax, ground-nuts, and oil seeds. The imports are chiefly soft goods, provisions, and hardware. The chief towns are Blantyre, Zomba (the headquarters of the administration), Fort Johnston (principal port on Lake Nyasa and naval depôt), and Chiromo (port at the junction of the Ruo and Shire). At Chinde, at the mouth of the Zambezi, a piece of Portuguese territory is leased for the transshipment of goods free of duty. Blantyre is connected with Port Herald (near the Portuguese boundary) by rail; the line is being continued to Lake Nyasa. The protectorate is connected telegraphically with the Cape *via* Salisbury. See Sir H. H. Johnston's *Brit. Central Africa* (1897); H. Drummond's *Tropical Africa* (1888); Scott Keltie's *The Partition of Africa* (1895); H. L. Duff's *Nyasaland under the Foreign Office* (1906); and *The Handbook of Nyasaland* (1st issue 1909).

British Columbia, a prov. of Canada, bounded on the E. by

Alberta, s. by the United States, w. by the Pacific Ocean and Alaska, and N. by the 60th parallel of N. lat. The boundary with Alaska was definitively settled by the award of the Alaskan Boundary Commission in October 1903. Its estimated area of 350,000 sq. m. includes the former crown colony of Vancouver I. (area, 14,000 sq. m.). In 1866 the two colonies were united, and in 1871 were admitted, as the Province of British Columbia, into the Dominion.

The surface is extremely rugged, and contains some of the finest mountain scenery in America. The chief rivers are the Columbia and the Fraser. The coast, much indented by long fjords, is protected by a submerged mountain range, forming a continuous chain of islands. Part of the coast-line (55° to 60° N.) belongs to Alaska. The climate varies greatly, but is much milder than that of the corresponding regions on the east of America in the same latitude. The interior generally is dry and almost rainless, but parts suffer from heavy rainfall.

The chief industries are mining, fishing, lumbering, and fruit-growing. A large part of the country is densely wooded, and many trees are of great commercial value—e.g. the Douglas pine, the Monzies fir, and the red cedar. The mines, forests, fruit-farms, and fisheries are the chief sources of wealth. The rivers swarm with salmon, and there are numerous canneries. The seal fishery, formerly depleted, is slowly reviving under the Herring Sea Regulations. The annual value of the fisheries is about £1,600,000.

The mineral wealth is incalculable. Extensive coal fields occur on the mainland, and at Nanaimo on Vancouver I. The Nanaimo coal field (area, 200 sq. m.) forms an important factor in naval defence, being close to and

in railway communication with Esquimaux harbour, the fortified headquarters of the N. Pacific squadron. On Queen Charlotte I. is a large anthracite coal area. The province produces about 1,700,000 tons of coal annually. Iron is found in many places. The output of gold is over £1,000,000 per annum. In the Kootenay districts quartz-mining has been largely developed, owing to the opening of the Crow's Nest Pass branch of the C.P.R., and there too fruit-growing has taken firm root. The gold fields of the Cassiar district are within the boundaries of British Columbia. The population is about 280,000. The chief towns are Victoria, the capital, on Vancouver I.; Vancouver; New Westminster, the former capital; Nanaimo, Rossland, Nelson, and Prince Rupert.

The province is administered by a lieutenant-governor, with executive council and legislative assembly of forty-two members, and is represented at Ottawa by three senators and seven members of the House of Commons. See Warburton Pike's *Through the Sub-Arctic Forest* (1896); H. S. Somerset's *The Land of the Muskeg* (1895); Begg's *History of British Columbia* (1894); Macnab's *British Columbia for Settlers* (1898); W.D. Wilcox's *The Rockies of Canada* (new ed. 1900); and *Official Publications* of the province.

British Cotton-growing Association, formed under royal charter in 1904 to exploit new sources of cotton supply within the British empire, and so render the Lancashire cotton trade less dependent on the crops of the United States, and less liable to the disastrous effects of a shortage and widely fluctuating prices. Its capital was fixed at £500,000, but was not fully subscribed—three-fourths being offered to the public for subscription. The prospectus states that experiments carried

on since 1902 have demonstrated that all the cotton which Lancashire requires can be produced in the British colonies, dependencies, and protectorates. Steps have already been taken to encourage cotton-growing in India, the W. Indies, British Guiana, E. and W. Africa, Australia, and S. Africa, and the government has fully recognized the imperial character of the association's work. The approximate value of the cotton grown more or less directly under the auspices of the association is:

1904	£75,000
1905	150,000
1906	200,000
1907	390,000
1908	350,000
1909	450,000

Head offices of the association: 15 Cross Street, Manchester.

British East Africa, the largest political division of E. Equatorial Africa, extending from some 400 m. of coast on the Indian Ocean to the Congo Free State and the western watershed of the basin of the Upper Nile on the west. The southern boundary runs from Umba in a N.W. direction to the intersection of the Victoria Nyanza with the 1st parallel of N. lat., skirts the northern shore of the lake, and thence strikes W. to the boundary of the Congo Free State. The northern boundary begins at the mouth of the Juba R., which it follows to the intersection of the stream with the 6th parallel of N. lat., then runs to the 35th meridian E. long., and follows that to its intersection with the Blue Nile (Anglo-German agreements, 1886 and 1890). Total area (including part of Somaliland), about 1,000,000 sq. m. British East Africa consists of (a) the EAST AFRICA PROTECTORATE (*q.v.*), and (b) the UGANDA PROTECTORATE (*q.v.*). In 1905 British E. Africa was taken over from the Foreign Office by the

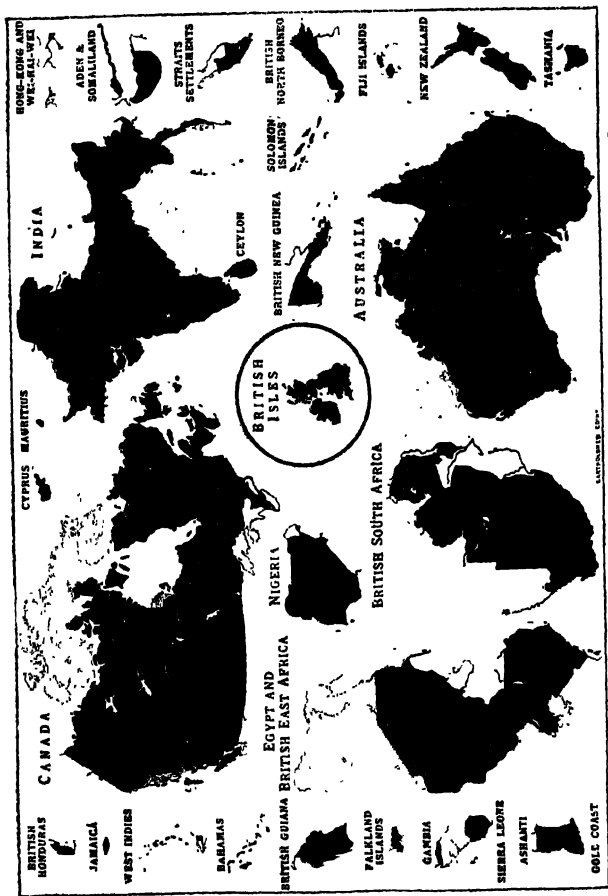
Colonial Office. See Lugard's *British East Africa and Uganda* (1892); Purvis's *Handbook of British East Africa and Uganda* (1900); Eliot's *East Africa Protectorate* (1905); and Playne and Gale's *British East Africa* (1910).

British Empire, the unofficial but popular and convenient term for the aggregation of territory under the British crown. The title of the British sovereign is 'George V., by the Grace of God of the United Kingdom of Great Britain and Ireland and of the British Dominions beyond the Seas King, Defender of the Faith, Emperor of India.' The various colonies, possessions, protectorates, etc., which comprise the empire are indicated in the accompanying table. Many of these states have responsible government and a parliamentary system, approximating closely to that of Great Britain and Ireland, granted by the Imperial Parliament. All legislative acts of these local parliaments require the royal assent, which is given through a governor or governor-general nominated by the crown, and exercising certain royal prerogatives, though in practice most of his duties are ceremonial and social. Theoretically, the transcendental power of Parliament over every dependency of the British crown exists, but practically it is in abeyance in the case of the local affairs of self-governing colonies, and is never exercised except when its action is invited by a colonial legislature, or when a colonial legislature refuses or neglects to perform its proper functions. Every colonial subject enjoys the advantages of British citizenship, and the right of ultimate appeal in legal matters to the judicial committee of the Privy Council. One material privilege within the empire, and peculiar to it, is the imperial

penny postage, established in 1898. Each self-governing colony is practically an *imperium in imperio*. The symbol of unity throughout the empire is the authority of the crown. A growing desire that the colonies should make a proportional contribution to the cost of imperial defence, and should thereby forge a new and tangible link between the colonies and the mother country, led to a discussion of the question at the meetings of the colonial premiers with the colonial secretary in 1902. Imperial federation is still in the air, a fresh form being given to it by Mr. Joseph Chamberlain's preferential tariff proposals of 1903. The formation of an imperial committee of the Privy Council has been suggested as the basis of an imperial organization. (See IMPERIAL FEDERATION, and the works there cited.) Another suggestion is that the cabinet should summon to its councils colonial premiers and other specially qualified persons when grave matters of imperial interest come up for discussion. Next in dignity to the self-governing colonies are the colonies which have a measure of representative government, their legislative bodies being partly elective and partly nominated by the crown through the governor. Crown colonies are ruled directly by the imperial government, through their respective governors and local officials. Dependancies, in the specific use of the term, are subordinate to the government of some other possession, or are provinces or parts of colonies administered by functionaries appointed by the governments on which they are dependent. Protectorates are areas more or less subject to British control by treaty or otherwise, but internally independent. In addition, the empire includes 'spheres of influence' nominally

belonging to Britain, but either unoccupied or not yet brought under authority. Egypt and the Sudan form an anomalous class, not yet formally included in the empire, but practically under British control exercised in the name of the locally reigning sovereign. Many islands and rocks throughout the world are British territory, but are not included in any colony or separate protectorate. Some of them are uninhabited, others are leased by the lords commissioners of the Treasury to private individuals or companies for the collection of guano or the planting of coconut palms. The extraordinary growth of the empire during the latter half of the 19th century may be illustrated by the fact that in the sixty years from 1837 to 1897 it was augmented in area by 2,921,000 sq. m., and was increased in population by 232 millions, 2½ millions being whites. The absolute dependence of the empire and its trade on British sea power is too obvious to need more than a passing reference. Permanent squadrons are maintained in the English Channel, the Atlantic, the Mediterranean, Newfoundland, China, E. Indies, Australia, and Cape of Good Hope; and fortified coaling stations enable a warship to be sent to any part of the world.

History.—Before the Turks crippled the Italian cities by shutting up the old avenues of trade to the East, and thus compelled, in a measure, the maritime enterprise of Portugal, England was at least a century behind her continental neighbours. But the voyages of Vasco da Gama and Columbus changed the whole situation, and for the first time the geographical position of the British Isles became a national asset. But England did not at once enter into the race for over-sea dominion and trade. The



Block Map showing the Parts of the British Empire on a Uniform Scale.

voyages of the Cabots remained but isolated incidents, and were the achievements of alien adventurers. England had as yet no navy, and had to serve a century-long apprenticeship to the sea before she was fitted to play her destined part; and the dynastic as opposed to national ambitions still drew the island power into the complications of continental politics. The 16th century is the period of England's preparation for empire. Henry VIII. built up a navy, and prepared the way for the naval glories of Elizabeth's reign. England took the Protestant side in the religious controversies, and religious zeal was at least one of the animating motives of her buccaneering adventurers in their ceaseless forays against Spain; while Elizabeth drew England from the turmoil of dynastic policies, and made the national policy, first fully realized by another 'kinless loon,' Oliver Cromwell, the ideal of English statesmanship.

When, at the beginning of the 17th century, English colonies at length were founded, all the most eligible situations had been appropriated. Gold mines and silver mines and the spices of the East were the chief objects of desire, and in the unappropriated lands gold and spices there were none. But the luck of the British empire was never more strikingly displayed than in the fate that gave it cod fisheries and wheat fields, pine forests and tobacco plantations, instead of the mines of Peru and the spices of the East. The natives were singularly intractable, but the land was nearly empty. The natives could not be reduced to servitude or induced to labour, but the climate was no bar to colonization and work; and the very absence of dazzling mineral wealth was the reason for the colonies being treated with that 'salutary neglect' which was so

fruitful a cause of their development. It was not the English character, but the English luck, that gave her a New England, a Virginia, a Newfoundland, on which to form her national and her colonizing character, before she was tempted by the more dazzling prize of India.

The beginnings of settlement were made in Newfoundland in 1583 by Sir Humphrey Gilbert; but little progress was made either there—in the oldest colony—or in Virginia, which Raleigh named in honour of Queen Elizabeth in 1584. But the formation of the Virginia Company in 1606 may be taken as the practical starting-point of the British empire. The method of colonization by companies was much favoured in that age; but, as Adam Smith points out, one advantage the English colonies had over those of other nations was that their trade, if monopolized, was not restricted to a single port, as the Spanish colonies were, or to a single company. The single instance of a local company, the Plymouth Company, did not long survive the intrusion of the Pilgrim Fathers into their sphere of influence, and the colonies were early regarded as national concerns. The charter of the Virginia Company was revoked in 1624, and the colony came under direct rule. In 1620 the Pilgrim Fathers, who had been granted freedom to settle in the territories of the Virginia Company, landed at Cape Cod, and formed the colony of Plymouth; and in 1627 the rights of the Plymouth Company, such as they were, were bought up by the colonists. New Scotland, or Nova Scotia, had in the meanwhile been granted to Sir W. Alexander, though but little was effected save the creation of Nova Scotia baronets.

The early Stuart kings had no ideas regarding colonial policy.

But the colonies gained, rather than lost, by neglect. Representative institutions had sprung up almost spontaneously; religious tolerance was practised, or at least nonconformity was permitted; and what of commercial regulation there was favoured rather than restricted the colonies. It was a period of quiet growth.

Cromwell stands out as our greatest colonial statesman. It was he who discerned that the problem of international politics was colonial expansion. The history of the 17th century is somewhat obscured by the fact that it is the meeting-ground of two policies. The contests of the 16th century were dominated by the religious issue; the politics of the 18th century were concerned with colonial empire. In the 17th century it was sometimes the one and sometimes the other; and it is difficult to say which idea drove Cromwell to war with Spain, which resulted in the capture of Jamaica in 1655. But envy of Holland's greatness is the keynote of much of England's policy during the 17th century. Cromwell, indeed, did not adopt Shaftesbury's 'Declenda est Carthago' attitude in his speeches, but the Navigation Act of 1651 was as resolutely anti-Dutch. This measure was not primarily colonial, but commercial. It was aimed at the Dutch carrying trade, and was but the last of a long series of Navigation Acts. It differed from its predecessors in being effectual, and it was rendered so by the existence of the colonial trade of England, in which the Dutch had managed to participate. In reality it greatly favoured the colonies, especially New England, where it encouraged shipbuilding.

The rivalry with the Dutch continued unabated during the reign of Charles II. The Navigation Act was renewed and made more stringent by the Act of 1660 and

the Act of 1663. But unfortunately, while striking at the Dutch, these acts prejudiced the interests of the colonies; and from 1660 dates the policy of restriction on the commerce and industry of the colonies, which lasted for nearly two hundred years. In practice, neither in the 17th nor in the 18th century was there much hardship, for England was the natural market and the natural entrepôt for colonial goods; and by the operation of a system of drawbacks, goods were sold cheaper in the colonies than they could be bought by Englishmen in England. There were also restrictions on colonial industries, in order to secure the market for the English producer; but these restrictions were offset by bounties offered by England for the production of raw material for the English navy and for English manufacturing. On the whole, it may be said, with Brougham, that these restrictions were 'superfluous rather than burdensome,' which is perhaps a very strong condemnation of a system that was described by Burke as a 'badger of servitude.'

The colonial policy of the later Stuarts is not marked by the disgrace of their purely English record. Clarendon and Shaftesbury stand at least for enlightened ideas, and the whole period is one of steady growth in America. In 1664 the Dutch were driven from New Amsterdam, and New York was founded. In 1670 the Hudson Bay charter was granted, and in 1681 the colony of Pennsylvania was granted to Penn; and the solid block of colonies from New England to Florida was no mean record for three-quarters of a century of colonizing.

The English revolution brings into the foreground the fundamental issue of the 18th century, the rivalry between England and France, unobscured by dynastic or religious questions. Aided by

the policy of Cromwell and the Stuarts, France had increased while the Dutch had decreased. Richelieu had created a French nation and consolidated colonial policy, and Colbert had the genius to reorganize the commercial system by borrowing Dutch ideas. France was thenceforth the antagonist; and when, by the Family Compact, she commanded the strength of Spain, she was a rival that strained every resource of England. The result was a hundred years' duel for supremacy, which did not end till Waterloo. By La Salle's discovery of the Mississippi, and the consequent foundation of Louisiana, it became the object of France to shut the English colonies in between the Alleghanies and the sea. France commanded the two main routes into the interior of the continent, the St. Lawrence and the Mississippi; while the English colonies quarrelled among themselves, and placed obstacles in the way of the action of the English government. But France failed in the 18th century, as Napoleon failed in the 19th, because she could not keep clear of European entanglements. England had cut herself free, and fought France in Germany and the Low Countries only to gain territory in America and the Indies. The English colonies increased in population, in commerce, and in wealth, and their compact and growing mass was irresistible against a stationary population and a primitive stage of industry which French organization fixed upon Canada.

It is not necessary to describe in detail the growth of the British empire by conquest during the first half of the 18th century. It is by conquest rather than by settlement that it grew. The treaty of Utrecht in 1713 finally added Nova Scotia, and secured recognition of the English right

to Newfoundland, leaving to the French, however, the ambiguous and vexatious French shore rights. The war of the Spanish Succession broke down the Spanish monopoly; and the great Seven Years' war was fruitful of conquest for England in America and in India. Canada was the great acquisition in America, and the British East India Company found itself at the close of the war a territorial sovereign on an immense scale. The peace of 1763 seems to mark the final triumph of England; yet it was but the prelude, and in part the cause, of a great disaster—the revolt of the American colonies.

During the long war period the colonies suffered but little, and contributed materially to the success of British arms. The capture of Louisburg stands to their credit, and they anticipated by a century and a half the contribution of colonial contingents. In the main they were not burdened, and were left free to develop their own resources in their own way; and they increased rapidly in population. Adam Smith points to this political freedom as one of the chief causes of their prosperity; and whatever may have been the grievances of the colonies, political oppression was not one of them.

Two ideas struggled from the first to dominate colonial policy—that of settlement and that of possession. The Navigation Acts mark the triumph of the idea of possession, so far as commerce was concerned; but whether through distance or indifference, the English at home did not press the idea of possession so far as to prevent the growth of representative institutions, or to demand a tribute. The colonies possessed a larger measure of freedom than was enjoyed at home; and since there was but a slight emigration from England, and their increase was almost entirely a natural

STATISTICS OF THE BRITISH EMPIRE.

	Area in Sq. Miles.	Pop. in 1,000's (est.)	Governments.
UNITED KINGDOM:—			
England and Wales	58,323	36,000	} Constitutional Monarchy. Governor, Council, and House of Keys. } Lieut.-Governor; Court; States.
Scotland	30,405	5,000	
Ireland	32,360	4,370	
Isle of Man	227	55	
Jersey	45	100	
Guernsey, etc.	30		
	121,390	45,525	
EUROPE:—			
Gibraltar	2	18	Military Governor.
Malta	95	213	} Governor; Councils.
Gozo	20		
Comino	2	260	High Commissioner; Councils.
Cyprus	3,581		
	3,703	491	
ASIA:—			
Aden Dependencies and Protected Ter- ritory, Perim, Socotra, Kuria Muria, etc.	10,500	46	} Political Resident (under the Government of Bombay).
Bahrain Is.	..	70	
India and Burma	1,007,900	235,000	Political Agent under Indian Govern- ment. Viceroy; Council, Departments.
Indian Feudatory States, Baluchi- stan, etc.	690,272	62,460	Native Rulers under Political Super- vision. Governor; Executive and Legislative Councils.
Ceylon	25,330	4,150	Under Straits Settlements with Resi- dent General. Governor; Executive and Legislative Councils.
Federated Malay States	38,000	1,650	Under Madras Government. Under Ceylon Government. } Chief Commissioner under Indian Government.
Straits Settlements.	1,600	630	Governor (British North Borneo Com- pany).
Laccadives	740	10	Native Sultan under British Resident.
Maldives	..	..	Protected State under Rajah Brooke.
Andaman	2,500	18	} Governor; Executive and Legislative Councils. Governor.
Nicobar	615	6	
Borneo, British North	31,106	175	} The Union of South Africa—Govern- nor-General; Executive Council; Senate; House of Assembly
Brunei	4,000	25	
Sarawak	52,000	600	} Resident Commissioner.
Hong-kong and Kowloon	400	400	
Wei-hai-Wei	245	130	
	1,954,263	304,380	
AFRICA:—			
Cape of Good Hope	276,995	2,500	} The Union of South Africa—Govern- nor-General; Executive Council; Senate; House of Assembly
Natal	35,371	1,206	
Transvaal	110,426	1,360	
Orange Free State	50,302	400	
Basutoland	10,293	348	
Bechuanaland Pro- tectorate	275,000	134	

STATISTICS OF THE BRITISH EMPIRE.

	Area in Sq. Miles.	Pop. in 1,000's (est.)	Governments.
AFRICA (continued):—			
Swaziland	6,536	86	Resident Commissioner. Executive Council and British South Africa Company.
Rhodesia, N. & S. . .	440,000	1,600	
Nyasaland Protec- torate	43,600	1,000	} Governor; Executive and Legislative Councils.
East Africa Pro- tectorate	200,000	4,000	
Uganda Protector- ate	118,000	4,500	Governor and Native Council.
Zanzibar Protec- torate	1,020	250	Sultan and Consul-General.
Somaliland Protec- torate	68,000	350	Commissioner.
Mauritius	700	380	} Governor; Executive and Legislative Councils.
Seychelles	155	22	
Gambia	4,500	160	} Governor and Native Residents. Governor; Executive and Legislative Councils.
Sierra Leone	33,000	1,500	
Gold Coast Colony ..	120,000	2,000	} Governor and Executive Council. Under the Admiralty.
Northern Nigeria ..	256,000	9,000	
Southern Nigeria ..	80,000	6,500	
St. Helena	47	3·5	
Ascension	35	0·1	
	2,130,070	37,209·6	
AMERICA:—			
Canada	3,745,574	7,500	Governor-General; Parliament.
Newfoundland and Labrador	162,734	237	} Governor; Parliament.
Bermudas	20	17	
British Honduras ..	8,662	45	} Governor; Executive and Legislative Councils.
Bahamas	4,450	60	
Barbados	166	194	} Governor and Legislative Assembly. Governor; Executive and Legislative Councils.
Jamaica	4,424	350	
Trinidad & Tobago ..	1,863	300	} Governor-in-Chief and Councils. Governor; Executive and Legislative Councils.
Leeward Is.	705	127	
Windward Is.	724	400	} Governor; Executive and Legislative Councils.
British Guiana	90,500	300	
Falkland Is. and South Georgia	7,300	2·4	
	4,027,227	10,032·4	
AUSTRALASIA:—			
New South Wales ..	310,367	1,645	} Separate State Legi-latures and Governments (Governors); Federal Parliament and Government; Governor-General and Executive Council.
Victoria	87,884	1,273	
Queensland	670,500	580	} Under Commonwealth Government. Governor and Houses of Parliament. Governor and Legislative Council.
S. Australia	280,070	375	
Northern Territory ..	523,620	25	
Western Australia ..	975,920	280	
Tasmania	28,215	185	
Papua	90,540	400	
New Zealand	104,751	1,030	
Fiji	7,435	130	
Pacific Islands:—			
Tonga, Solomon, & Gilbert Is., etc. . .	112,556	211	High Commissioner for the Western Pacific.
	3,189,858	6,114	
Total	11,426,516	403,842	

growth, they quickly came to a sense of detachment. By the middle of the century foreign observers noted this independence of idea, and predicted that if ever the menace of the French on the northern border were removed the colonies would declare their independence. It is doubtful how far Canada had been a real menace, but events which followed its conquest rapidly prepared the way for disruption.

The treaty of Paris (1763) found England burdened with a huge debt. It was never proposed to burden the colonies with any part of the debt, but it was considered necessary that they should provide for their own defence. This they were willing to do, but the different colonies could come to no agreement; and considering the necessity of the situation, the home government took the fatal resolution of levying taxes in the colonies to provide such an army. All the money was to be spent in the colonies, and the imperial government acted only because the colonies were too jealous of each other to act together. So the famous Stamp Act was passed in 1765, and the tea duties were imposed in 1767. This was an extension of the idea of possession. A policy of interference was new, at least in its application. And so the American colonies were lost, and England was left in 1783 with possessions entirely differing in character from the colonies she had lost. The most important of them were won by conquest, and contained large alien populations. The maxims of colonial government had to be changed, and it was three-quarters of a century after 1783 before colonial policy was as enlightened as it had been before 1763.

In truth, the revolt of the American colonies paralyzed colonial policy; and although the Navi-

gation Acts survived in form till 1849, the mercantile policy which inspired them was discredited by the totally unexpected results of the loss of America. By all the rules England should have been ruined, and her trade with America destroyed; but, as a matter of fact, America as a free nation bought more from England than she had done as a colony. By a singular coincidence the moral of the situation had been enforced by Adam Smith in the *Wealth of Nations*, published in the year of the Declaration of Independence (1776), and event and comment served to illustrate each other. The lesson of freedom was, however, not learned at once, and the growth of trade with the United States served rather to discredit the old than to establish a new colonial policy. The exigencies of the long war with France rendered it necessary to make temporary relaxations of the commercial restrictions, and after the war these temporary measures were confirmed by statute. Canada was favoured, and her lumber industry created, by a system of bounties which military policy suggested; and the restrictions were practically all removed by the reforms of Huskisson. The interest of the colonies in the free-trade movement was that their preference in the home market should be retained, and the repeal of the Navigation Acts left them unaffected.

But though the revolt made for greater freedom in commerce, it had the opposite effect with regard to government. The period from 1783 to 1850 may be described as the period of despotic government. In no one of the sixteen colonies acquired by conquest or occupation at the beginning of the 19th century did representative institutions spring up as they had done naturally in the early American colonies. While there was

little interest in, and no sense of the value of, colonial possessions, there was a very great jealousy of colonial freedom, as likely to lead to republicanism and separation. Even as late as the time of the Reform Bill, a secretary of state could declare that to allow a popular assembly was to create a republican institution. There is a certain justification for this change of policy in the changed character of the colonies. They were no longer settlements of Englishmen; they were possessions. The colonies acquired by conquest had never enjoyed self-government.

The struggle for responsible government comes out most distinctly in the history of Canada. After the capture of Quebec in 1759, Canada remained under military rule till 1774, when the Quebec Act was passed to establish regular government. This act, guaranteeing French liberties and customs, was effective at least in keeping the Canadians loyal during the war of independence; and the wise government of Carleton saw the nucleus of a new empire safely through the troubled period. The Quebec Act, however, had given an almost indefinite expansion to French Canada; and after the immigration of the United Empire loyalists during and after the war, it was felt that a change was necessary to secure to these loyalists some measure of independence of the French element. The result was the Constitutional Act of 1791, which created the new province of Upper Canada (Ontario). But even of the loyalists the home government was jealous, and they were not accorded the measure of self-government which the former American colonies had enjoyed. During the early decades of the 19th century there was a large influx of settlers from the United Kingdom, and the

effect of their presence was a gradually increasing agitation for responsible government. In 1837-8 discontent of a racial character in Lower Canada (Quebec), and of a political character in Upper Canada, resulted in rebellion, and in the famous mission and report of Lord Durham (1840), which marks an epoch in colonial history. The Union Act of 1840 endeavoured to remove the causes of both racial and political discontent by reuniting the provinces separated by the Act of 1791; but as history showed, it resulted in a series of deadlocks, from which escape was not found till 1867, in the foundation of the Dominion of Canada. Meanwhile the agitation for responsible government, which involved the control of all the finances, continued, and the boon was eventually conceded, first to the Canadian colonies, and later to Australia (1855). The same agitation arose in all colonies where there was a relatively large population of European descent; and, on the Canadian precedent, responsible government was granted to Cape Colony in 1872, and to Natal in 1893. On the other hand, the measure of responsible government granted to Jamaica had to be withdrawn; and about the middle of the 19th century, the distinction, with which all are familiar, between crown colonies and self-governing colonies, emerged.

The war with Napoleon resulted in a great growth of the empire; and at this time only, perhaps, is it true that the British empire was picked up in a fit of absent-mindedness. With the exception of India, these new possessions had merely a prospective value. None were regarded with enthusiasm; most were acquired with reluctance. With the exception of Tobago and St. Lucia, all the British conquests in the W. Indies were returned to France.

Trinidad, which had belonged to Spain, was, however, retained. Mauritius, which was captured in 1810, thus ending the French danger to India, was retained at the peace, simply because, in the hands of France, it had been a danger to British commerce. The Cape, which had been taken from the Dutch (1795), returned, and afterwards retaken, was retained as a naval and military station on the way to India. Australia had been formally taken possession of for the empire, and in 1788 it started its colonial career as a convict station. Colonial policy was a policy of drift from which the home administration was not saved even by the pressure of the agitation against slavery.

After the abolition of the slave trade in 1808 there grew up a tenderness of conscience regarding the treatment of native races. This was practically a new phenomenon: for in spite of the example of Ponn, little regard except hatred had been shown for the natives by the American colonists; and England had a bad pre-eminence in the slave trade, for participation in which she had fought at least one war. The new colony at the Cape was especially an object of observation on the part of philanthropists at home. There the Dutch settlers maintained the early attitude towards the natives, who, however, showed no signs of conveniently melting away before European civilization and vices, as the aborigines of America and Australia have done; and the origin of most of the difficulties of S. African history has been the indiscreet and inconsistent interference of the home authorities with the native question. In other colonies the problem has been solved by the local action of the colonies themselves; but in S. Africa the native question still remains a source of difficulty

between the colonists and the imperial government. The same difficulty arose in New Zealand, which was founded in 1840; but there the matter was complicated with land questions, which led to long wars with the Maoris.

Australia presented its own problems. It was founded in 1788 as a convict settlement, and the colony of New South Wales included the greater portion of the continent, Tasmania, and most of New Zealand; and the Australasian colonies have been formed by separation from the original colony—Tasmania, 1825; W. Australia, 1829; S. Australia, 1836; Victoria, 1851; Queensland, 1859. New Zealand was formally annexed in 1840. Responsible government could not be thought of in convict settlements, and it was not till transportation had ceased, and free settlement had altered the character of the population, that colonial history there began. Responsible government followed in the wake of representative institutions, and in 1901 the Australian colonies federated into the Commonwealth of Australia.

The development there was quite normal; but the history of S. Africa is a history of blunders and mistakes. The Dutch themselves could probably have been assimilated or reconciled, as the Dutch and French were in America; but the Dutch and the natives together have been too much for peaceful development. The first considerable migration of British settlers took place in 1817 and 1820, and since then there have been four parties, often at variance with each other—the Dutch, the English, the natives, and the imperial government, which has never remained long of one mind. Several times the Dutch have sought to leave the sphere of British administration, and several times they have been brought back under it, with their

United Kingdom Trade with British Possessions, 1909.

	Imports.	Exports.
	£	£
Channel Islands	1,689,701	1,251,689
Gibraltar	27,555	585,304
Malta and Gozo	30,573	800,756
Canada	25,222,963	15,688,105
Newfoundland (including Labrador).	325,313	610,090
Bermudas	5,831	125,651
British West India Islands (including Bahamas)	2,161,600	2,396,018
British Guiana	722,117	636,012
British Honduras	105,586	110,796
Australia	32,646,415	23,998,845
New Zealand	17,730,866	7,351,619
British India	35,430,771	43,581,501
Straits Settlements & Dependencies.	8,459,708	3,668,702
Ceylon and Dependencies	5,546,827	1,827,508
Hong-kong	455,674	3,567,350
Mauritius and Dependencies	232,264	398,569
Aden and Dependencies	187,953	296,632
Eastern Coast of Africa: Territories under British influence	477,706	487,683
Natal	1,821,969	3,537,600
Cape of Good Hope	7,693,042	6,188,013
Rhodesia	113,895	512,003
Transvaal	1,305,845	4,405,369
Colony and Protectorate of Southern Nigeria	2,280,905	2,388,529
Protectorate of Northern Nigeria.	11,435	317,429
Gold Coast	693,672	1,141,344
Sierra Leone	173,774	431,618
Gambia	34,394	100,824
Cyprus	173,024	131,987
Other British Possessions.	490,561	284,609
Total	145,251,939	126,822,155

Total Trade of the United Kingdom, 1909.

Total exports of United Kingdom to all the world	£469,525,166
Total imports of United Kingdom from all the world	624,704,957
	<u>£1,094,230,123</u>
Total exports to foreign countries	£333,206,095
Total imports from foreign countries	477,796,713
	<u>£811,003,408</u>
Total exports to British possessions	£136,318,471
Total imports from British possessions	146,908,244
	<u>£283,226,715</u>

will or against it. Natal was annexed in 1843 (responsible government, 1893), to head off a Dutch migration. The Orange River sovereignty was assumed in 1848, and abandoned in 1854; the Transvaal was annexed in 1877, and practically abandoned in 1881. The S. African war led to the annexation of both republics, and at the close of the war crown colony government was set up. Self-government was granted soon afterwards, and in 1909, following the model of Canada and Australia, the several colonies were united as provinces of the Union of South Africa.

But if S. Africa is a portion of the empire whose history cannot be regarded with satisfaction, the history of the British conquest and rule of India may be taken as a compensation. The English went to India with no idea save to trade, and to safeguard and secure that trade they were led by gradual steps to build up an empire. There they met their rivals the French, and from the French they learned the art of subduing India by employing sepoys. They were well served by their agents, such as Clive and Hastings, and managed to hold their own even against such Frenchmen as Dupleix; and when, in 1788, Lord Cornwallis went out as governor-general, he went to rule an empire which had been won while America was being lost. The E. India Company had long ceased to be merely a trading concern, but it continued in some sort of authority over India even after Pitt's India Bill had transferred the sovereignty to the crown. The change made in 1858, however, was in name and imagination only, as the policy had long been directed by the government at home.

About 1831 a change is discernible at home in the attitude towards the empire. A Malthusian fear of over-population had

created an interest in emigration; and an important school, headed by Wakefield, advocated schemes of systematic colonization. These schemes proposed to do away with the wholesale and often corrupt disposal of colonial lands, and in theory had much merit; but there was another and more important reform demanding attention—viz. the granting of responsible government, the logical conclusion of which was the ownership of colonial lands by the colonies. Responsible government has entailed many consequences which the promoters on both sides failed to realize. It involved sanctioning colonial tariffs based on protection (1859), which free traders were sorry to admit; and it involved the withdrawal of imperial troops (c. 1870) from the colonies, throwing on them the responsibility for their own defence, thus solving satisfactorily the difficulty which faced Grenville in 1763; and it has meant the creation of an entirely new type of political relationship, for which the term colony is felt to be inadequate—a practically independent nation, with the power to determine, in all respects, its present policy and its political future; one, moreover, whose relations to the mother country in matters of trade and finance and defence have not been fully worked out.

In the later decades of the 19th century a period of expansion set in, after a long period of consolidation; and with it revived the original policy of forming chartered companies as pioneers of empire. Africa was the chief sphere of activity, and charters were granted to the Royal Niger Company in 1886, the Imperial British E. Africa Company in 1888, and the British S. Africa Company in 1889. Of these, the Niger Company has already been superseded by the imperial government, and the S. Africa Company is said

to be willing to be absorbed. The activity of these and other companies has added greatly to the extent and responsibilities of empire, without in any degree adding to its strength or stability, and has brought the empire into contact with a new rival colonial power, Germany. See Sir J. R. Seeley's *Expansion of England* (new ed. 1895); Dilke's *Problems of Greater Britain* (1890), and *The British Empire* (1899); Davidson's *Commercial Federation* (1900); H. E. Egerton's *British Colonial Policy* (1897); Jos's *The Growth of the Empire* (3rd ed. 1901); and Goldman's *The Empire and the Century* (1905).

British Empire League, an association formed in 1895, in London, for the purpose of promoting trade between the United Kingdom, the colonies, and India; fostering closer intercourse between the different portions of the empire by the establishment of cheaper and more direct steam, postal, and telegraphic communication; devising a more perfect co-operation of the military and naval forces of the empire, with a special view to the due protection of the trade routes; assimilating, as far as possible, the laws relating to copyright, patents, legitimacy, and bankruptcy throughout the empire; the calling of periodical conferences to deal with these and similar questions on the lines of the London Conference of 1887 and the Ottawa Conference of 1894. Office of the association: 112 Cannon Street, London, E.C.

British Guiana, a crown colony (area, 90,277 sq. m.) on the N. coast of S. America, having Dutch Guiana, Brazil, and Venezuela on the E., S., and W. respectively. The chief rivers are the Essequibo, the Corentyne (obstructed by rapids 150 miles from its mouth), the Demerara and Berbice, the Barima (navigable

for 80 m.), and the Amacuro. British Guiana is rich in gold; it is washed in all the river valleys, from the Barima in the west to the Berbice; while the mountains are more or less auriferous. There are promising diamond fields, principally in the Mazaruni district; iron ore and manganese are also found. The climate is hot, but the range of temperature is small: average maximum, 90°; minimum, 76° F. Rainfall, 120 to 140 inches annually on the coast, heavier in the forest region. The flora is that common to the tropical parts of S. America. On the southern border, and also between the Essequibo and Corentyne, are grassy plains. The centre is covered with forests yielding valuable timber, of which mora and greenheart and a kind of gutta-percha (balata) are noted. Orchids are abundant and varied. The Eta palm grows on the savannas, and the Victoria regia water-lily in the rivers. The fauna includes the jaguar and ant-eater, monkeys, tapirs, agoutis and other rodents, the boa constrictor, the frogs, fishes, and insects of Brazil. The inhabitants are chiefly Portuguese from Madeira, Negroes (more than half population), Hindu coolies, and Chinese (settlement, Hopetown). The aborigines (Caribs, Arawaks, and others) number about 8,000. The cultivation of the sugar-cane and the manufacture of sugar (over £1,200,000 worth exported annually), rum, and molasses are the principal industries. Rice is grown, and timber, rubber, and balata are exported. The exports are valued at over £2,000,000, and the imports at £1,800,000 per annum.

The settled part of the country is about one-tenth of the whole, and lies near the coast, along the navigable rivers. Here there are roads and 108 m. of railways. The ports are Georgetown (the capital)

and New Amsterdam. Pop. about 300,000.

The old settlements of Demerara, Essequibo, and Berbice are counties. The Dutch first settled on the Pomeroon R. early in the 17th century. The British were in possession of this colony from 1781 to 1783, and again from 1796 to 1802, and lastly from 1803 to 1814, when the present colony was formed, except that Berbice was administered separately down to 1831. British Guiana has had many frontier disputes with Brazil and Venezuela, the latter being brought to a head by gold discoveries in the Cuyuni. (See VENEZUELA.) The Brazil frontier question was submitted to arbitration in 1901, and settled by the award of the king of Italy in 1904.

See Schomburgk's *Reisen in Britisch Guiana in den Jahren 1840-44-47*; Brown's *Canoe and Camp Life in British Guiana* (1887); J. Rodway's *Handbook of British Guiana* (1893), and *Hist. of British Guiana* (3 vols. 1894); H. Kirke's *Twenty-five Years in British Guiana* (1898); Bayley's *Handbook of British Guiana* (1909); Harris and De Villiers's *Rise of British Guiana* (1911).

British Honduras, a crown colony on the E. coast of Central America, between the Mexican state of Yucatan and Guatemala. The N. part is low, and full of swamps and lagoons, while S. of the Belize R. the Cockscorn Mts. extend into the colony from the Guatemalan boundary. South of these mountains, hilly country nearly 2,000 ft. high connects them with the ranges of Central Guatemala. The chief exports are mahogany, logwood, bananas and plantains, and cocoa-nuts. The more accessible forests having been well worked, the quality of the timber is declining; but it is hoped that the cultivation of fruit, cocoa, sugar, and india-

rubber will be extended. The climate generally is damp and hot, but not unhealthy. The temperature ranges from 50° to 98°. The average lies between 75° and 80°, but this is considerably tempered by the prevailing sea-breezes. The imports amount to about £550,000, and the exports to £450,000 annually. The chief customers are the United Kingdom and the United States. The population is composed chiefly of Indians, only 1 per cent. being Europeans. The capital and chief port is Belize. Area, 8,600 sq. m. Pop. 45,000. See Gibbs's *British Honduras* (1883), and Bristowe and Wright's *Handbook of British Honduras* (1890-93).

British India. See INDIA.

British India Steam Navigation Company. This company was originally established in 1856 as the Calcutta and Burma Steam Navigation Company, and took its present name in 1862. It has a capital of £1,700,000. Its principal business is in the East, but it also conducts a large business between England and India and Australia. It owns a fleet of 117 steamers, aggregating 480,563 tons. Dividends averaging about 7½ per cent. are paid to the shareholders. London offices: 9 Throgmorton Avenue, E.C.

British Institute of Social Service, constituted July 18, 1904, on the lines of the Musée Social, of Paris and of a similar institute in America. Its object is to provide a central bureau of information on all forms of practical social service. Office: 4 Tavistock Square, London, W.C. There are four joint-secretaries.

British Isles, THE, a very extensive archipelago west of the continent of Europe, from which it is separated by the North Sea, the Strait of Dover, and the English Channel. The whole archipelago consists of the two large islands of (a) Great Britain, com-

prising England, Wales, and Scotland; (b) Ireland; together with (c) about 5,000 small islands lying in groups to the n. (Orkney and Shetland), to the w. (Hebrides, Isle of Man, the small coast islands of Ireland, and the Scilly Islands), and to the s. (Isle of Wight and the Channel Islands, the last-named belonging geographically to France). Total area, 121,390 sq. m. Pop. 45,525,000.

British Medical Journal, THE, official organ of the British Medical Association. In 1810 the *Provincial Medical and Surgical Journal* was started, under the direction of Dr. Hennis Green and Dr. Streeten, and was issued weekly. In 1853 the title was changed to the *Association Medical Journal*; and four years later, when the Provincial Medical and Surgical Association became the British Medical Association, the paper appeared under its present name. Mr. Ernest Hart was editor from 1866 until his death in 1898. He was succeeded by Dr. Dawson Williams. The *Journal* holds a high position among the medical periodicals of the world.

British Medical Temperance Association. See TEMPERANCE SOCIETIES.

British Museum. In 1753, under the will of Sir Hans Sloane, his books, MSS., natural history collections, and curiosities were offered to the nation for the sum of £20,000, on condition that they should be kept together in a museum. An Act of Parliament was passed the same year, providing for the acceptance of this offer; for the purchase, for £10,000, of the collection of MSS. formed by Robert Harley, Earl of Oxford; and for the proper housing of the earlier collection of MSS. formed by Sir Robert Cotton in the reign of James I., and given to the nation by his grandson in 1700, but so badly cared for that a fire in

1727 destroyed or damaged a considerable part of them. Montague House, Bloomsbury, was purchased for £10,250, and opened (in 1759) under the title of the British Museum, the three collections already named having been previously augmented (in 1757) by George II.'s gift of the royal library formed by successive kings and queens of England, from Henry VII. to Charles II. When the museum was opened, its means were so limited that for a long time the trustees could not spend as much as one hundred pounds on purchases in any single year. The regulations at this time only allowed a maximum of thirty visitors in any one day, and the use of the reading-room was similarly restricted. In 1772, however, the vases, antiquities, and drawings of Sir William Hamilton were purchased by parliamentary vote for £8,400; in 1799 the Rev. Clayton Mordaunt Cracherode bequeathed to the museum his fine collections of books and prints; the Egyptian antiquities obtained under the capitulation of Alexandria were presented by George III. in 1802; the Towneley marbles, coins, and drawings were bought between 1805 and 1814 for £28,200, the Lansdowne manuscripts in 1807 for £4,925, the Phigalian marbles in 1815 for £15,000, the Elgin marbles in 1816 for £35,000, and the Burney library in 1818 for £13,500. Lastly, in 1823, by an arrangement with his successor, the terms of which have never been disclosed, the magnificent library formed by George III. was transferred to the museum. These large additions, with the more liberal regulations adopted in 1810, by which the public were admitted freely between ten and four on three days in each week, demanded an increase of space far in excess of the accommodation offered by Montague House. A new wing was first erected on the

west side of the building for the reception of the Towneley and Elgin marbles; next a fine gallery was opened on the east side in 1827 for the king's library (books collected by George III.); and these wings were finally joined by galleries on the north side, and by an imposing façade in the Ionic style, from the designs of Sir Robert Smirke, the whole building being complete in 1847. Meanwhile, however, under the vigorous administration of Anthony Panizzi (an Italian refugee, who became keeper of the printed books in 1837), the library had been growing by leaps and bounds. Panizzi obtained from the government an annual grant of £10,000 to make good its deficiencies; rigorously enforced the Copyright Act, by which a copy of every book printed in the United Kingdom must be delivered to the museum within one month of publication; and, by his influence with the Right Hon. Thomas Grenville, procured the bequest (in 1847) of the magnificent Grenville library, a collection of 20,240 vols. As the books multiplied readers multiplied also, and, to provide room for both, in 1854 a plan of Panizzi's was accepted by which the quadrangle round which the galleries of the museum were built was to be occupied by a great circular reading-room, with a diameter of 140 ft. and a height of 106 ft., surrounded by galleries constructed entirely of iron, containing twenty-five miles of shelving, and accommodating about a million books. This building was opened in 1857, and both the circular reading-room and the iron 'bookstack' (in which the light admitted from a glass roof penetrates through the gaps between the railings which form the floors) have served as models for many similar constructions. By the subsequent invention of 'sliding' bookcases, which run forward

from the face of the fixed ones, the miles of shelving (including those in the older parts of the library) were increased by the year 1900 to about forty-six, though the method of counting pamphlets only according to the volumes in which they are bound has restricted the official estimate to between 2,000,000 and 3,000,000 volumes.

Meanwhile other departments of the museum also grew rapidly, and as early as 1860 it was determined to move the natural history collections to South Kensington, where the site of the exhibition of 1862 was purchased the year after it closed. A new terra-cotta building, from the designs of Mr. Alfred Waterhouse, was begun in 1873, finished in 1880 (the main contract having been for £352,000), and opened the following year. The style is that known as Early Romanesque, modelled on that which was common in Lombardy and the Rhineland from the 10th to the 12th century. The frontage is 675 ft., the dimensions of the splendid hall, which forms the chief feature of the building, being 170 ft. long, 97 ft. wide, 72 ft. high, and the exhibition galleries 273 ft. by 50 ft.

The removal of the natural history collections from Bloomsbury left space there for the display of the ethnographical collections given by Henry Christy in 1865, and, with a bequest of £65,000 by William White (which, though made in 1823, only accrued on the death of his widow in 1879), the White Wing was built, jutting out from the south-east angle, and providing fine rooms for the display of pottery and glass, and prints and drawings. During the tenure of the chancellorship of the Exchequer by Sir William Harcourt (1892-4) the ground at the back of the museum was purchased on terms liberally offered by the Duke of Bedford, and the new

annexe which is in course of completion will be formally opened sometime during 1911.

The total annual grant in 1909-10, including that of the British Museum of Natural History, amounted to £198,478. The number of visitors to the parent museum in Bloomsbury in 1909 was 708,836, of whom 276,040 were students in the reading-room or other departments. The number of visitors to the Natural History Museum at South Kensington (including 61,435 on Sundays) was 535,116, of whom 20,068 were students. Both museums are opened free to the public every week-day except Good Friday and Christmas Day, and on Sundays from 2 p.m. till dusk. Admission to the reading-rooms and studies is granted to students over twenty-one years of age, on the written recommendation of a householder, sent at least two days previously. The recommendations of lodging-house keepers and hotel proprietors are not accepted.

Among the more notable of the special collections at the British Museum itself are the sculptures from the Parthenon at Athens (5th century B.C.), known as the Elgin marbles, removed to England by Lord Elgin in 1801-3, and purchased in 1816; the sculptures of the mausoleum at Halicarnassus, excavated in 1857; the Assyrian sculpture from the palace of Assur-nasir-pal (B.C. 885-860) at Nimrud; the bas-reliefs from Nineveh of the reigns of Tiglath-pileser III. (B.C. 745-737), Sennacherib (B.C. 705-681), and Assur-bani-pal (B.C. 668-626), and the cuneiform inscribed slabs which formed Assyrian books; the series of Egyptian sculptures ranging from B.C. 4000, and of mummies and objects found in their tombs; the exhibition of articles illustrating the different religions of the world; the collections of

tools, weapons, ornaments, and dress of races in all the earlier stages of civilization in every continent; the mediæval antiquities, Roman remains in Britain, collection of gold ornaments, of coins and medals, and ancient Greek vases; lastly, the collections illustrating the history of books in manuscript and print, including autographs of many famous men and women.

Since 1909 important acquisitions have been added to the collection of MSS., coins, and antiquities. In the department of printed books eighty old English books have been added to the library, and include works from the presses of Julian Notary, Richard Pynson, Wynkyn de Worde, and Thomas Berthelet.

At the natural history museum the great hall is occupied by an 'introductory' collection illustrating the variation of animals under domestication; the adaptation of their colour to environment; the phenomena of albinism, melanism, etc. The western galleries are devoted to stuffed specimens of animals and to their skeletons, the eastern galleries to minerals and botany. Among other collections specially interesting to holiday visitors are the birds' eggs and the butterflies, and the Gould collection of humming-birds.

British New Guinea. See NEW GUINEA and PAPUA.

British North America Act, an act passed by the British Parliament (Mar. 29, 1867), providing for the voluntary union of the provinces of Canada, Nova Scotia, and New Brunswick into one confederation, under the title of 'The Dominion of Canada.' The British government at the same time guaranteed a subsidy of three millions sterling to complete the inter-colonial railway. By the British North America Act of June 29, 1871, the Parliament of Canada

may establish new provinces. The Dominion now includes the whole of British North America, except Newfoundland and the Bermudas.

British North Borneo. See BORNEO.

British Pacific Cable, opened for traffic on December 8, 1902. This 'all British' cable runs from Vancouver to Fanning I., thence to Fiji and Norfolk I., and by means of two cables to New Zealand and Queensland respectively. Total length, 7,838 nautical miles. The Telegraph Construction and Maintenance Company were the contractors, their tender being for £1,795,000. The governments of the United Kingdom, Canada, and Australasia have proportional interests in it—United Kingdom and Canada, five-eighteenths; New South Wales, Victoria, Queensland, and New Zealand, two-eighteenths each.

British Science Guild, founded in 1904 'to convince the people, by means of publications and meetings, of the necessity of applying the methods of science to all branches of human endeavour; to bring before the government the scientific aspects of all matters affecting the national welfare; to promote the application of scientific principles to industrial and general purposes; and to further scientific education.' Office: 199 Piccadilly, W.

British South Africa. See CAPE OF GOOD HOPE, BECHUANALAND, BASUTOLAND, RHODESIA, TRANSVAAL, ORANGE FREE STATE, and NATAL.

British South Africa Company, THE, was chartered on Oct. 29, 1889, through the efforts of Cecil Rhodes, who was its animating spirit. The company has great administrative powers in the region known as Rhodesia, being authorized to promote trade and commerce, and to work and develop mineral and other con-

cessions over an area of about 750,000 sq. m. Dr. Jameson (now Sir L. S. Jameson, Bart.) was the administrator of the company's territories till the Transvaal Raid (1895-6), when he was succeeded by Earl Grey. The present administrator is Sir W. H. Milton. The president of the Board of Directors is the Duke of Abercorn. The authorized capital of the company amounts to £9,000,000. See RHODESIA, CHARTERED COMPANIES, and annual *Reports* of the company.

British Temperance League. See TEMPERANCE SOCIETIES.

British Weekly, THE, one of the leading religious newspapers in Britain, was founded in 1886 by Sir William Robertson Nicoll, who has always contributed a great deal to its columns in the form of sermons, essays, leading articles, and literary notes, the last written under the pen-names of 'Claudius Clear' and 'The Man of Kent.' As the organ of nonconformist opinion, the *British Weekly* takes a strong line on political questions, and was a determined opponent of Mr. Balfour's Education Act of 1902. It publishes a literary supplement, composed chiefly of book reviews by competent critics. Special editions are also published for Scotland and Ireland, containing the religious news of these respective countries. Among its contributors have been Mr. J. M. Barrie and 'Ian MacLaren.'

British West Africa. See GAMBIA, SIERRA LEONE, GOLD COAST, LAGOS, NIGERIA.

British West Indies. See WEST INDIES.

British Western Pacific. The High Commissioner for the W. Pacific has jurisdiction over all islands in the W. Pacific not within the limits of Fiji, Queensland, and New South Wales, or of any civilized power. The High Commissioner is governor of Fiji.

See FANNING, FIJI, GILBERT ISLANDS, ELLICE ISLANDS, PHOENIX GROUP, PITCAIRN ISLANDS, SOLOMON ISLANDS, TONGA ISLES, and UNION OR TOKELAU ISLANDS.

British Women's Temperance Association. See TEMPERANCE SOCIETIES.

Britomartis, a Cretan divinity, daughter of Zeus and Carine; like Artemis, a virgin huntress. Minos loved and pursued her; to escape from him she threw herself into the sea, but was saved by Artemis, who made her a goddess. In Crete she had the surname Dictynna. Clearly she is Artemis under another form.

Briton Ferry, par. (1,593 ac.) and seapt., Glamorgan, Wales, at mouth of Neath R., 2 m. s.w. of Neath. The docks are in direct communication with Merthyr-Tydvil and Aberdare and the Rhondda Valley, and belong to the G.W.R. Coal mines; steel, tin, and iron works. Pop. 7,000.

Brittany, the English form of Bretagne, a former prov. of France (anc. *Armorica*), forming the depts. Ile-et-Vilaine, Côtes-du-Nord, Finistère, Morbihan, Loire-Inférieure. Brittany has always had a character of its own, which has been intensely reflected in its inhabitants. The Breton of our own days, either sailor, fisherman, or cultivator, is hardy, obstinate, a devout Catholic, and very frugal, but addicted to drink. The language spoken belongs to the Cymric division of Celtic, and is allied to Welsh. The climate of Brittany is temperate, but wet; the soil poor; the coast rugged, but with good harbours. Armorica was conquered by Cæsar in 57-56 B.C., but its pre-Roman history is little known, in spite of the profusion of megalithic monuments. In the 5th and 6th centuries it was invaded, partly settled, and Christianized from England and Ireland, and was

thereafter called Britannia Minor. From the end of the 10th century to the middle of the 15th century Brittany was practically independent of the French kings, being governed by dukes—Geoffrey, son of Henry II. of England, and Geoffrey's son, Prince Arthur, being two of them. It was united to the French crown in 1532. See BRETON LANGUAGE AND LITERATURE; and La Monneraye's *Géographie Ancienne et Historique de la Bretagne* (1885), Le Braz's *The Land of Pardons* (1906), and Bell's *Picturesque Brittany* (1906).

Brittle-stars (Ophiuroidea), a class of the group Echinodermata, including star-shaped forms in which the arms are slender, and do not contain prolongations of the viscera, as in the starfish (Asteroidea). The adjective brittle refers to the tendency which the Ophiuroidea display to throw off portions of the arms, these being regrown later. The arms are the agents in locomotion, which is performed by active wriggling, the tube-feet being devoid of suckers, and too small to be locomotor organs, as in the starfish. Other differences from starfish are the absence of an anus, and of an open ambulacral groove on the under surface. Common British forms are *Ophiothrix fragilis* and *Ophiopholis aculeata*.

Britton, JOHN (1771-1857), English antiquary, topographer, and miscellaneous writer, produced his first work, *The Adventures of Pizarro*, in 1799. In 1801 he began to edit the *Beauties of Wiltshire*, the third volume of which did not appear until 1825. Along with Brayley, he edited most of the *Beauties of England and Wales* (1801-15). His numerous works include *Architectural Antiquities of Great Britain* (1807-14), with a supplement, *Chronological Hist. (and Graphic Illustrations) of*

Christian Architecture in England (1818-26), and *Histories of Various Cathedrals* (14 vols. 1814-35). See his *Autobiography* (1850), and *Papers* (1856-7).

Britz, vil., dist. Potsdam, prov. Brandenburg, Prussia, 4 m. S. of Berlin. Pop. 10,000.

Brive (anc. *Briva Curretia*), tn., dep. Corrèze, France, on riv. Corrèze, 16 m. by rail S.W. of Tulle; stands in a fertile and lovely district; has manufactures of carpets, paper, and candles; trades in preserves, *pâté-de-foie gras*, geese, truffles, wine, and nuts. Pop. 21,000.

Brixen, tn., episc. see, and summer resort in Tyrol, Austria, in the Puster Valley, 24 m. by rail N.E. of Bozen. Its cathedral, with two copper-roofed towers, dates from the 15th century. The bishopric was founded in the 4th century, and from 1179 to 1803 its bishop was a prince of the empire. Pop. 6,000.

Brixham, seapt., mrkt. tn., and par. (5,611 ac.), Devonshire, England, on Torbay, opposite Torquay. The town is the headquarters of the fishing industry of Torbay, and has a home for orphans of seamen. In the vicinity are iron mines and limestone quarries. A cavern, 600 ft. long, when explored in 1858, was found to contain bones of many animals now extinct in Britain, and flint implements. William of Orange landed here in 1688. Pop. 8,000.

Brixlegg, vil., Tyrol, Austria, near the river Inn, 20 m. by rail E.N.E. of Innsbruck; has important smelting works for silver and copper ores found in the neighbourhood, as at Rattenberg. Alt. 1,750 ft.; the village stands in a beautiful position, which makes it a favourite summer resort. Passion plays were represented here with great success in 1868, 1873, 1883. Pop. 1,200.

Brixton. See LONDON.

Briza, or **QUAKING GRASSES**, a small genus of plants belonging to the order Gramineæ, characterized by their short, broad, flat, several-flowered spikelets, hanging, in the British species, at the extremities of slender branches, and thus in constant motion in the slightest breeze. Only two species are indigenous, *B. media* and *B. minor*—the former a very common species on light limestone soils, the latter confined to a few localities in England, and frequently cultivated in gardens as an ornamental annual.

Broach (*Bharuch*), tn., 30 m. N. of Surat, near the mouth of the river Narbada, Gujarat, Bombay, India; was once an important port. English and Dutch factories were established here during the 16th century. Broach was taken by the British in 1772, ceded to Sindhia in 1783, and retaken by the British in 1803. It has an export trade in raw cotton, grain, and seeds. Pop. 43,000. The fertile and healthy district of Broach has an area of 1,467 sq. m., and a pop. of 290,000.

Broad Arrow, the cognizance of Viscount Sydney, Earl of Romney, who was master-general of the ordnance (1693-1702); first used in his day as the royal mark on government stores. To deface or obliterate this mark is felony; unlawful possession of goods so marked is punishable with forfeiture and a penalty of £20.

Broad Arrow, mining tn., W. Australia, 24 m. N.N.W. of Kalgoorlie. Pop. (dist.) 3,000.

Broadbent, **SIR WILLIAM HENRY** (1835-1907), English physician, was born and educated at Huddersfield. He afterwards studied at Owen's College, Manchester, and in Paris. He was physician in the London Fever Hospital and St. Mary's Hospital, London; President of the Medical Society of London, 1881; physician-in-ordinary to the Prince of

Wales (1892), physician-extraordinary to Queen Victoria (1893-1901), and physician-in-ordinary to the late King Edward VII. He was created a baronet in 1893, and acted as chief of the civil medical staff in S. Africa in 1899. He was the author of *An Index of Diseases* (3rd ed. 1883), *The Pulse* (1889), and *The Heart* (1897).

Broadhurst, HENRY (1840), English politician, born in Oxfordshire, was a stonemason, who became secretary of the Labour Representation League (1875). He was elected M.P. for Stoke-on-Trent (1880-5), for Bordesley (1885-6), for Nottingham (1886-92), for Leicester (1894-1906), and was appointed Under-Secretary of State for the Home Department (1886), and has served on a number of royal commissions (Housing of the Working Classes, Condition of Aged Poor, etc.). He promoted the Leasehold Enfranchisement Bill, and has written a *Handy Book on Leasehold Enfranchisement*, with Sir R. T. Reid (1885); and *The Story of my Life*, an autobiography (1901).

Broadmoor, asylum in Sandhurst par., Berks, England; was built in 1863, and has accommodation for 700 criminal lunatics.

Broads, THE, the low, flat district in Norfolk and Suffolk, but mainly in the former county, intersected by the lower courses of the rivers Yare, Bure, Ant, and Waveney, which unite near Yarmouth in Breydon Water. Connected with these rivers by 'dykes' are the 'Broads' proper—large, shallow lakes, surrounded by reedy swamps and reclaimed land. The main rivers are navigable by the Norfolk wherries, the 'Broads' by small craft drawing four feet. Most of the landscape is essentially Dutch in character. Fish and wild fowl are very plentiful. Yachting on the 'Broads' is a favourite holiday pastime. See Walter Rye's *A Month on the*

Norfolk Broads (1887); Emerson and Goodall's *Life and Landscape on the Norfolk Broads* (1887); and Dutt's *The Norfolk Broads* (1903).

Broadsides. See CHAPBOOKS.

Broadstairs, eccles. par. and wat.-pl., Isle of Thanet, Kent, England, 2 m. N.E. of Ramsgate; brought into notice by Charles Dickens, whose residence here gave the title *Black House* to one of his novels. Sand for filters is exported. Pop. 6,500.

Broadswold. See FENCING.

Broadwater, par. (2,735 ac.) and vil., Sussex, England, 10 m. W. of Brighton. Near it is a very fine and well-preserved Roman camp (Cissbury). Famous for its market produce, a great quantity of which is grown under glass. In 1902 it was incorporated into the borough of Worthing.

Broadwood, JOHN, AND SONS, the well-known London firm of pianoforte-makers, founded in 1732 by Burkhard Tschudi, a Swiss, who came to London in 1718. John Broadwood (1732-1812), a native of Cockburnspath, Berwickshire, who married Tschudi's daughter, joined him as partner in 1769, and became sole proprietor in 1783. Several generations of Broadwoods carried on the business until it became a limited company.

Broadwood, ROBERT GEORGE (1862), British soldier, commanding troops in S. China since 1906. He went on active service in 1896 with the Dongola expeditionary force, and was present in the engagement at Firket and the operations at Hafir. The following year he took part, in command of the Egyptian cavalry, in the engagement at Abu Hamed and the occupation of Berber, and in 1898 was present at the battles of the Atbara and Khartum. He proceeded to S. Africa in February 1900, in command of the 2nd Cavalry Brigade. A month later

a mounted force under his command, which was crossing Thabanehu, 38 m. E. of Bloemfontein, was compelled to retire, and in so doing a portion of the force was cleverly ambushed by General De Wet at Sanna's Post (Koorn Spruit). A convoy of six guns of U Battery and one gun of Q Battery Royal Horse Artillery, and over 200 men, were captured, together with a large quantity of baggage. Broadwood was engaged in the 'sweeping' operations in the north-eastern portions of the Free State in 1901, capturing General A. Cronje, General Wessels (Steyn's brother-in-law), and many other prisoners. In 1903 Broadwood was appointed colonel on the staff, and (1904-6) brigadier-general commanding the Bloemfontein district.

Broca, PIERRE PAUL (1824-80), French anthropologist, born at Sainte-Foy-la-Grande, Gironde, and died at Paris. He became (1853) professor of surgical pathology at Paris, and surgeon to the four great hospitals; founded the Anthropological Society of Paris (1859), and in 1876 a school of anthropology. He was made a member of the Legion of Honour (1868). A great master of anthropology, he devoted special study to craniology; founded *La Revue d'Anthropologie* (1872); and published many scientific works, including *Des Anévrismes et de leur Traitement* (1856), *Instructions Générales pour les Recherches Anthropologiques* (1865; 2nd ed. 1879); *Mémoires sur les Caractères Physiques de l'Homme Préhistorique* (1869); *Mémoires d'Anthropologie* (1871-83, 1888). Broca was one of the founders of the Association Française pour l'Avancement des Sciences (1872).

Brocade, a fabric with a pattern of raised figures, supposed to have been first manufactured in China. It is said that the word brocade was first applied only to

stuffs of gold or silver threads, or of both in combination; but all mention of brocades occurring in early accounts is of cloths 'broched' or embroidered upon coloured grounds. Fairholt considers brocade to have been very rare on the Continent, even in the 14th century, and that it was probably not known at all in England as early as the 13th century. The word afterwards came to be applied particularly to metallic tissues, the manufacture of which is fully described by Porter in his work on *Silk Manufacture* (included in Dr. Lardner's *Cabinet Cyclopædia*, 1830-49). These were especially manufactured at Genoa, Florence, and Venice, as well as in Spain, in the 16th century. By degrees silk was introduced into this manufacture as a ground for ornaments of gold or silver threads, for which the name of brocade was still retained; and later silk was employed alone, so that the name came to apply to any material having a raised pattern.

Broccoli, a vegetable of Italian origin, was recognized as a distinct garden variety in Britain at the end of the 17th century. It is characterized by an artificial development of the flower stems and abortive flowers, as in its relative the cauliflower. A heavy loam is required for the plants; and as they are not perfectly hardy, losses occur in severe winters in cold localities. A succession may easily be provided, so that broccoli shall be available from Michaelmas till June. For this purpose seed of suitable varieties should be sown at intervals from April to June. For autumn and early winter, good sorts are the self-protecting autumn, the early white Cape, and Sutton's Michaelmas white. For midwinter the Penzance and superb early white are two of the best kinds, and for spring Carter's

champion, dwarf white, and late queen.

The ground should be somewhat heavy, and should be trenched to a depth of two feet, a liberal admixture of manure being afforded; the seed-beds also should be well dug. The seed should be sown thinly, and the young plants shifted at an early age. When moving them into their final quarters, at least two feet should be allowed from plant to plant. See G. Wythes's *Book of Vegetables* (1901).

Broch. Etymologically the same as *borough*, *burgh*, and *borg*, this term is applied in N.E. Scotland to an archaic round tower of a peculiar type, which is only found in Scotland, though there are various kindred structures in other countries. In the western and the Gaelic-speaking districts the words *dùn* (pronounced *doon*) and *caiseal* (i.e. 'castle') are employed. Brand (1700) describes them as 'round, in the form of some dove-cotes, or something like unto an egg bulging out in the middle.' The maximum height of the brochs can only be guessed at nowadays, for most of them are absolutely ruined, and even the best preserved specimen—that on the island of Mousa, in Shetland—lacks some of its upper courses. From its present height (something over 40 ft.), however, one may estimate that no Scottish broch ever rose higher than 50 ft. The diameter of these towers, measured from the outside, is usually about 60 ft. at the base.

The chief peculiarities of the brochs are these:—They had no exterior windows whatever, and the only aperture in the outer wall was a small doorway at the base. When the door was closed and strongly barred, the tower was impregnable to the ordinary assault of primitive times. Nor could the besiegers ever hope to scale the

walls, for the uppermost courses were made to project slightly outwards, like the overhanging rim of a jar. Sir Henry Dryden (1872) seems to dispute this; but Hibbert, writing fifty years earlier, when the tower at Mousa was more complete, emphatically asserts that the drawing of his predecessor Low (1774), which omits to show this feature, is 'in a most unaccountable degree faulty.' Hibbert therefore portrays that tower as he saw it; and his representation is here reproduced, as it probably gives the best general idea of what a broch was when complete.

The tower was quite roofless, and its interior was simply a hollow cylinder, devoid of any flooring, from the ground up to the summit. The rooms were all within the wall itself, which was of great thickness, often 15 ft. Except in its lowest story, which was solid save for an occasional chamber, this huge wall was split in two by successive tiers of low, narrow galleries circling all round it, and connected by a staircase which wound from base to summit. These galleries received light and air from one or more series of rectangular windows that, opening into the inner area or 'well,' rose one above another like a ladder; for only a stone slab divided each aperture from the other. Indeed, it is not unlikely that these slabs actually served as ladders. Thus, the only roofs in the building were those of the galleries, and of the mural chambers on the ground floor; and all these roofed portions were presumably used as sleeping-places by the broch-dwellers. The unroofed court or 'well'—which frequently had an actual well sunk beneath it—is believed to have been occupied by live stock during a siege. In some cases there is a difficulty in accepting this theory, owing to the lowness of

the entrance. The masonry of the brochs is of rudely-shaped, unmortared stone, and the only arch known to the builders was the 'false' arch.

The probable era of the broch-builders is believed by Dr. Joseph Anderson to be 'not earlier than the 5th and not later than the 9th century.' Bishop Tulloch of Orkney, writing in 1443, states that when Harald Haarfagr, king of Norway, invaded the Orkneys in the 9th century, he there found the Picts, whom Tulloch describes as a dwarfish race, occasionally living in little underground houses, and at other times working diligently at their 'cities'—i.e. brochs. The broch of Mousa is known to have been temporarily inhabited by Norsemen in the end of the 9th century, and again in the middle of the 12th century. The dun of Carloway, in Lewis, is said to have been similarly occupied in the end of the 16th century.

The number of ascertained brochs in Scotland may be estimated at between four hundred and five hundred, the majority having been situated in the northern parts. The keep of Conisborough in Yorkshire, although much more finished in style, is believed to be an improved variant of a pre-existing broch in that locality. The round towers of the aborigines of Colorado, U.S.A., of which ruins only remain, were essentially the same as the brochs of Scotland. See vol. v. of *Archæologia Scotica* (1890); and compare also ROUND TOWERS.

Bröchner, HANS (1820-75), Danish philosopher, who taught at the University of Copenhagen, though only from 1870 as professor. His first considerable work was a treatise on Spinoza (1857); others were *Bidrag til Filosofiens Historiske Udvikling* (1869), and *Filosofiens Historie i Grundrids* (1873-4).

Brochure. See PAMPHLET.

Brock, THOMAS, English sculptor, was born at Worcester (1847). After carrying off the highest honours at the Royal Academy's schools, he became a pupil of J. H. Foley, R.A., the leading opponent of the then prevailing formalism in sculpture, and afterwards his assistant. On his master's death, in 1874, Brock was commissioned to complete his O'Connell monument for Dublin, his statue of Lord Gough, also for Dublin, and his statue of Lord Canning for Calcutta. In 1883 he was elected A.R.A., and in 1891 he became an academician. Among his portrait-busts and statues may be mentioned a bronze bust of Lord Leighton (1873), his diploma work; a marble bust of Queen Victoria (1901); a statue of Sir Richard Owen; the equestrian statue, the *Black Prince*, at Leeds; the monument to Lord Leighton in St. Paul's Cathedral; and the Longfellow bust in Westminster Abbey. In 1901 he was commissioned to execute the sculptural motif of the National Memorial to Queen Victoria. Of his purely ideal work typical examples are *The Genius of Poetry* (1891), *Song* (1891), and *Eve* (Tate Gallery), *Hercules Strangling Antæus*, and a large equestrian group, *A Moment of Peril*, purchased for the nation under the Chantry bequest. His conception is noble, his feeling for form strong, and his work always broad in treatment, gracefully proportioned, and architectural in character.

Brocken, or BLOCKSBERG (anc. *Mons Bructerus*), the central summit of the Harz Mts., Germany, is 3,747 ft. high, and is situated 20 m. s.w. of Halberstadt. A railway was carried in 1898 to the top, where there is a meteorological station. The 'spectre' of the Brocken is caused by shadows falling upon a wall of mist at sunset. The Brocken was one of the

last strongholds of the heathen faith of the ancient Germanic peoples: the night of the first of May (Walpurgis night) was specially dedicated to the rites of the ancient worship; hence the legend of the Brocken as the scene of unholy glee and unlicensed revelry (the Witches' Sabbath) on that night, and hence, too, the intimate association in the popular mind of this mountain with the devil. See Goethe's *Faust*.

Brookes, BARTHOLOMÆ HEINRICH (1680-1747), German poet, born at Hamburg, where, returning in 1704 after a journey in Europe, he was elected to the senate; after carrying out several missions—as that to Vienna (1721), and to Copenhagen (1724)—he was in 1735 appointed for a period of six years bailiff at Ritzbüttel, and there composed *Landleben zu Ritzbüttel*. His principal work is *Irdisches Vergnügen in Gott* (9 vols. 1721-48), a collection of poetical and religious meditations. He also translated into German Pope's *Essay on Man* (1740) and Thomson's *Seasons* (1745). His *Autobiography* was published by Lappenberg in the *Zeitschrift des Vereins für Hamburgische Geschichte* (vol. ii. 1847). See *Life* by Brandl (1878).

Brockhaus, FRIEDRICH ARNOLD (1772-1823), born at Dortmund in Westphalia; founder of the well-known German publishing house. He started business in 1802, but removed to Altonburg in 1810, before which date he had purchased the *Konversations-Lexikon* of Löbel. He issued a new edition of that work in 1812, which made both his reputation and his fortune. He removed to Leipzig in 1817, and added to his publishing trade that of bookseller, in which he was equally successful. In his enterprise he was ably assisted by his son **HEINRICH** (1804-74), who, in

conjunction with his father and Avonarius, in 1837, established, at Paris and Leipzig, a library of German and foreign literature, which was carried on till 1844. **HERMANN** (1806-77), another son of F. A. Brockhaus, became a learned Oriental scholar, studying Indian literature in the German colleges, as well as at Copenhagen, Paris, London, and Oxford, and subsequently occupied the chair of Indian literature at Jena (1839) and at Leipzig (from 1841). He edited and translated many Sanskrit works.

Brockmann, JOHANN FRANZ HIERONYMUS (1745-1812), Austro-German actor; born at Graz. In 1766 he obtained an engagement at a theatre in Vienna, but moved in 1771 to Hamburg, where, under the direction of Schröder, he became the foremost actor of his day in Germany. His greatest triumph was achieved in 1777 in Berlin, in the rôle of Hamlet.

Brockram ('broken rock'), a term locally applied to certain breccias belonging to the Permian system, and found at Penrith, Appleby, and elsewhere in that part of England. They appear to have been originally angular broken material which accumulated on the shores of the Now Red Sandstone lakes. The fragments consist mainly of dolomitized Carboniferous Limestone; but pieces of Red Sandstone are quite common, suggesting a certain amount of contemporaneous erosion.

Brockton, city, Plymouth co., Massachusetts, U.S.A., 20 m. s. by w. of Boston, on the New York, New Haven, and Hartford Ry. Shoemaking is its principal industry, but rubber goods, paper boxes, sewing machines, and pianos are also manufactured. Pop. 57,000.

Brockville, town and port of entry, Leeds and Grenville co., Ontario, Canada, 126 m. s.w. of

Montreal, on l. bk. of the St. Lawrence, on Grand Trunk and Canadian Pacific Rys.; is a port of call for St. Lawrence steamers. Manufactures agricultural implements, and has tanneries and flour mills. Pop. 9,000.

Brod, tn., Hungary (Croatia-Slavonia), co. Pozsega, on the l. bk. of the Sava, 40 m. s.w. of Eszek (Esseg). It is strongly fortified. Pop. 6,500.

Brodfield, a plain of Hungary, Hunyad co., 15 m. s.w. of Karlsburg; famous for the battle in which Stephen Bathori defeated the Turks in 1479.

Brodick, seaside village, Arran, Buteshire, Scotland, 14 m. w.s.w. of Ardsrossan; a summer resort. Pop. 300. Brodick Castle is the chief Arran residence of the Hamilton family.

Brodie, SIR BENJAMIN COLLINS (1817-80), chemist, became professor of chemistry at Oxford (1855), and was president of the Chemical Society (1859-60). His name is associated with researches into the nature of graphite, and of that modified form of carbon present in graphite for which he proposed the name *graphon*.

Brodie, WILLIAM (1815-81), Scottish sculptor; born at Banff; studied at Edinburgh and Rome. His best-known works are *The Blind Girl*; *Rebecca*; *Ruth*; *Sunshine*; *The Maid of Lorn*; *Memory*; four busts of Queen Victoria (one at Balmoral); statue of *Prince Consort* at Perth, of *Sir James Young Simpson*, *Sir David Brewster*, and *Lord Cockburn* at Edinburgh, and of *Hon. George Brown* at Toronto, Canada.

Brodie, WILLIAM (d. 1788), burglar, was the son of Francis Brodie, a large cabinetmaker in the Lawnmarket, Edinburgh. In 1787 Brodie, who was one of the deacon councillors of the city, with three men, George Smith, Andrew Ainslie, and John Brown, committed many robberies in

Edinburgh, and on March 5, 1788, broke into the Excise Office in Chessel's Court, Canongate. Under sentence for another crime, Brown turned king's evidence. Brodie fled, but was arrested at Amsterdam, tried along with Smith, Aug. 27, 1788, and hanged on October 1. *Deacon Brodie*, a play by R. L. Stovenson and W. E. Henley, is founded on his life.

Brodrick, WILLIAM ST. JOHN. See MIDLETON, VISCOUNT.

Brody, tn. in the E. of Galicia, Austria, 53 m. by rail E.N.E. of Lemberg; has considerable trade with Russia. Pop. 18,000.

Brodzinski, KAZIMIERZ (1791-1835), Polish poet; born at Krolówka, Galicia. He joined the French army (1809), fought in the Russian campaign (1812-13), and was taken prisoner at Leipzig. He afterwards became (1822) professor of aesthetics at Warsaw University till its suppression (1831). His most important work is the idyll *Wieslaw* (1820). A collected edition of his works was published in 8 vols. in 1872-4.

Broek-in-Waterland, vil., prov. N. Holland, Netherlands, 6 m. N.E. of Amsterdam; formerly proverbial for its excessive cleanliness. Its chief occupation is dairy-farming. Pop. 1,600.

Broglie, the name of a noble French family, originally from Piedmont; they were part founders of the city and republic of Chiari, in Lombardy. (1.) FRANÇOIS MARIE DE BROGLIE (1610-56) was the first to establish himself in France (1642); was naturalized in 1650, and had the title of comte. (2.) FRANÇOIS MARIE, DUC DE (1671-1745), marshal of France, grandson of (1); born at Paris; distinguished himself in several campaigns in Flanders, on the Rhine, and in Italy between 1689 and 1714. From 1724 to 1731 he was ambassador in London. Created a marshal in 1734, he made the campaign of Italy

(1733), and was commander-in-chief of the French army in Bohemia (1741). In 1742 he was created duke. (3.) VICTOR FRANÇOIS (1718-1804), son of (2), born at Münster, in Westphalia. At an early age he took part in the campaign of Italy under his father, and afterwards fought in Bohemia. In the Seven Years' war he greatly distinguished himself as a French general, took part in the battles of Rossbach (1757), Sondershausen (1758), and Bergen (1759), and for this last victory was made a prince of the empire and marshal of France, as well as commander-in-chief of the French army in Germany. Although victorious at Korbach (1760), he was defeated at Wilinghausen (1761). At the beginning of the revolution Louis XVI. made him minister of war; but he was forced to emigrate to Germany, and commanded the emigrants in Champagne (1792). Afterwards he entered into the service of England (1794) and of Russia (1797). (4.) CHARLES FRANÇOIS, COMTE DE (1719-81), brother of (3); diplomatist. Sent as ambassador to Warsaw in 1752, he combated the growing Russian influence in Poland, and at the same time endeavoured to pave the way for the election of the Prince of Conti as king of Poland. Then he took part in the Seven Years' war under his brother, and distinguished himself at Cassel (1761). After the war he became the head of the so-called secret cabinet of Louis XV. Broglie's activity centred round the prevention of the partition of Poland; he also prepared a scheme for the invasion of England. See Jacques Victor Albert, Duc de Broglie's *Le Secret du Roi* (1878). (5.) VICTOR CLAUDE, PRINCE DE (1757-94), son of (3); born at Paris. He was elected to the States-General in 1789, passed into the National Assem-

bly, embraced the revolution, and was employed with the Rhine army. He was, however, discharged in 1792, and was condemned to death by the revolutionary tribunal in 1794. (6.) MAURICE JEAN MADELEINE DE (1766-1821), brother of (5); bishop of Ghent. At the outbreak of the revolution he took refuge in Russia; in 1803 Napoleon made him his almoner, and in 1807 bishop of Ghent; but he fell into disgrace in 1811, through his opposition to Napoleon's policy with regard to the institution of bishoprics. Reinstated in 1814, he refused to take the oath of allegiance to William I., the new king of the Netherlands, because he was a Protestant. Thereupon Broglie, threatened with prosecution, fled to France (1816), but was condemned to transportation in *contumaciam*. (7.) ACHILLE CHARLES LÉONCE VICTOR, DUC DE (1785-1870), statesman and author, son of (5); born at Paris. In 1809 he was appointed by Napoleon to the Council of State, in which quality he served on several diplomatic missions. In 1816 he married the daughter of Madame de Staël. In 1830 he was a member of the first cabinet of Louis Philippe, in 1832 minister of foreign affairs, and in 1835 premier, when he negotiated with England the abolition of slavery. His policy towards England was one of peace and friendship. He resigned in 1836, and in 1847-8 was for a short time ambassador in London. In 1851 he retired from political life and devoted himself to literature, becoming a member of the Academy in 1856. Among the books he wrote (not all published yet) are *Vues sur le Gouvernement de la France* (1861), *Ecrits et Discours* (3 vols. 1863), *Le Libre Echange et l'Impôt* (1879), and *Souvenirs* (4 vols. 1885-8). See a monograph

by Guizot (1872). (8.) JACQUES VICTOR ALBERT, DUC DE (1821-1901), French statesman and author, eldest son of Louis Philippe's minister of that name. During the second empire he produced *Études Morales et Littéraires* (1853), a history of *L'Eglise et l'Empire Romain au IV. Siècle* (1856-66), a searching pamphlet on *The Maladministration of Algeria* (1860), *Souveraineté Pontificale et la Liberté* (1861), and *La Liberté Divine et Humaine* (1865). In 1871 he was elected to the National Assembly by the department of the Euro, and was appointed ambassador to London; but finding himself made the unwilling instrument of the abrogation of the Anglo-French commercial treaty of 1860, he resigned his post in 1872. He now became leader of the Conservative right centre, and in that capacity moved the order of the day which led to the resignation of Thiers and the acceptance by Marshal Macmahon of the presidency of the republic. The duke then became minister of foreign affairs and president of the Council; but his policy being strongly condemned by Gambetta, he resigned in May 1874. Elected to the Senate in 1876, in the following year he formed a royalist and imperialist cabinet, in which he became president of the Council and minister of justice. By various reactionary measures he again sought to overthrow the republic; but Gambetta forced him to resign. The last twenty-five years of his life were chiefly occupied in historical writing, notably *Le Secret du Roi* (1878), a valuable collection of state papers relating to the reign of Louis XV., and memoirs of Frederick II. (1882-4), Maria Theresa (1882-8), his father (1886), and Talleyrand (1891). Others of his publications relate more specially to members of his own family, others to men such as Malherbe

(1897) and Voltaire (1898), and others (*Le Père Lacordaire*, 1889, and *Saint Ambroise*, 1899) are connected with the history of the church. See Fagniez's *Le Duc de Broglie* (1902); *Généalogie de la Branche Française de la Maison de Broglie, 1610-1885* (anonymous, 1885); Boutaric's *Correspondance Secrète de Louis xv.* (2 vols. 1866); Doniol's *Histoire de la Participation de la France à la Constitution des États-Unis* (3 vols. 1887-9); Thureau-Dangin's *Histoire de la Monarchie de Juillet* (4 vols. 1884-7).

Brogue (Gael. *brog*), a shoe of coarse hide or deerskin, formerly worn by the Celtic races in Scotland and Ireland. The word also designates a dialectical pronunciation, and is usually applied to the Irish mode of pronouncing English.

Broich, tn., Rhonish Prussia, 15 m. N. by E. of Düsseldorf; has various manufactures and railway works. Pop. 8,000.

Broke, SIR PHILIP BOWES VERE (1776-1841), English rear-admiral, was present at the siege of Bastia, and at Hotham's two actions in 1795, as well as at the action with the *Vestale*, and at the battle off Cape St. Vincent in 1797. In 1798 he took part in Warren's engagement with Bonapart. On June 1, 1813, in the *Shannon* he fought the United States frigate *Chesapeake*, and, after a hot action, obliged the enemy to surrender. Broke, who was severely wounded, was created a baronet (1814), and in 1815 was made a K.C.B. He reached the rank of rear-admiral in 1830. See *Life* by Brighton (1866).

Broken Hill. (1.) Town, New South Wales, 925 m. W. of Sydney, and 260 m. N.E. of Adelaide, S. Australia. A fine town, Broken Hill has one of the most prolific silver mines in the world (the Proprietary), employing over 4,000 hands. Pop. 28,000. (2.) Gov.

station, North-Eastern Rhodesia, 374 m. by rail N.N.E. of the Victoria Falls on the Zambezi. Lead and zinc are found.

Broker, an agent for negotiating sales and purchases of goods or other property. Unlike a factor, he does not have possession of goods in respect of which he may be making contracts, nor can he sue on these contracts in his own name. Where he acts for a named principal, no personal liability attaches to him; and even where his principal is unnamed, he is only liable if there is a custom in the particular trade imposing this liability upon him. If, however, a broker, although in reality acting as an agent, does not purport to do so, personal liability attaches to him. He has an implied authority to buy and sell according to the custom of the market in which he deals. He is entitled to the customary remuneration for the work he performs, and to be indemnified by his principal against all liability properly incurred by him. (For stockbroker, see STOCK EXCHANGE.) An insurance-broker is generally an agent who effects policies of marine insurance. A bill-broker is not an agent but a principal. He buys bills at a discount, borrowing money at interest, and makes his profit on the difference between the discount and the interest. See W. Bowstead's *Digest of the Law of Agency* (1898), and Brodhurst's *Law and Practice of the Stock Exchange* (1897).

Bromberg, tn., Prussia, prov. of and 65 m. N.E. of Posen. The town, which has considerable industry in the production of machinery, vehicles, paper, with iron foundries, flour mills, tanneries, breweries, distilleries, brick works, and market-gardening, owes its importance to the construction of the Bromberg Canal—17 m. long, connecting the Warthe (Oder) with the Brahe

(Vistula)—by Frederick the Great in 1773-4. Pop. 54,000.

Brome, RICHARD (d. 1652), dramatist, was probably of humble birth. In 1614 he was 'man' or servant to Ben Jonson. He took to dramatic writing, collaborating with the younger Jonson in a lost comedy, *A Farall in Friendship* (1623), and with Thomas Heywood in *The Late Lancashire Witches* (1634). Of his independent plays, which include romantic and real life comedies, *The Northern Lass* (1632), *The Antipodes* (1640), and *A Jorrell Crew* (1652) are the best known. Brome's notion of comedy was founded on Ben Jonson's 'Humours.' See *Collected Works*, ed. Pearson (1873).

Bromeliaceæ, a natural order of monocotyledonous plants, entirely confined to America, and abounding chiefly in the tropical and southern portions of that continent. The order contains about five hundred species, nearly all of which are herbaceous plants, with short stems crowned by rosettes of long, leathery leaves, which not unfrequently exhibit a grayish appearance, owing to the small hairs with which they are clothed. The flowers are borne on terminal spikes, and are often large and brightly coloured, though without scent. Many of the species are epiphytic, and attach themselves to tall trees by means of aerial roots, without, however, obtaining from them any food material. Such, for example, is the tree-moss of tropical America (*Tillandsia usneoides*), which by the mere luxuriance of its growth often proves fatal to the trees on which it lives; it is frequently employed as a substitute for horse-hair in stuffing cushions. A number of species also grow in clefts on rock faces, where there is little or no soil; while others, like the pineapple (*Ananas sativa*), root in the usual manner.

Bromides. See MATERIA MEDICA, and next article.

Bromine (Br, 79.96) is an element of the halogen group, and has been known since 1826, but was not prepared in any quantity till 1860. It is present, in traces, in sea-water, but is usually obtained from the mother liquor of the Stassfurt potash beds, in which it is present as magnesium bromide. The bromine, which is present to the extent of about 0.25 per cent. in the liquor, is displaced by chlorine, either produced separately and added to the bromide solution, or else prepared in a still along with the bromide by the action of sulphuric acid and manganese dioxide on the chloride of magnesium present. The former plan is the better, as it can be worked continuously, and is carried out by making the liquor trickle down a tower packed with earthenware balls, where it meets a mixture of steam and chlorine that is passed up. As a consequence bromine is displaced ($\text{MgBr}_2 + \text{Cl}_2 = \text{MgCl}_2 + \text{Br}_2$), and passes out in vapour at the top of the tower into a worm surrounded by cold water, by which it is condensed to the liquid form and collected. Bromine is a heavy (sp. gr. 3.2), mobile, reddish-brown liquid; it is the only liquid non-metallic element. It boils at 59°C. , and gives off a dark-red gas; also readily volatilizing at ordinary temperatures. The gas has a strong, disagreeable odour, similar to that of chlorine, and has a most irritating effect on the eyes. It is somewhat soluble in water, and readily so in carbon disulphide, forming in both cases a red solution. Chemically, bromine is less active than chlorine, but more so than iodine. Thus, it unites with hydrogen to form hydrogen bromide when the mixture of gases is set on fire, or

if heated and exposed to light, forming a fuming gas. (See HYDROBROMIC ACID.) It also unites vigorously with most metals, phosphorus, sulphur, etc., and has some bleaching action. It produces painful sores if spilled on the skin, and has been used—though not to a great extent on account of expense—as a disinfectant. It is chiefly employed for the preparation of its compounds, which are largely used in photography and medicine, in the manufacture of coal-tar dyes, etc. The present production of bromine is about 400 tons per annum, though this could be greatly increased were the demand greater.

The bromides chiefly used in medicine are those of potassium, sodium, and ammonium. The average dose of each is from five to thirty grains. Bromides are powerful depressants of the nervous system, and hypnotics. They affect the circulation by lessening the force and frequency of the heart-beat. Toxic doses produce a fall of temperature. They are largely used in nervous diseases for their sedative and hypnotic effect, and are the most valuable drugs at present known for the treatment of epilepsy. Large doses are used, in combination with chloral, for delirium tremens. If bromides are taken, symptoms of poisoning, called 'bromism,' may appear. The first symptom is a rash of red acne-like papules on the face and back, next a lowering of the sensitiveness of the skin, then a diminution of sexual power. The individual becomes low-spirited, easily fatigued, unfit for work, his intellect is dulled, and in bad cases this may pass into dementia, melancholia, and other mental disorders.

Bromley, par., bor., and mrkt. tn., Kent, England, 10 m. S.E. of London. Francis Atterbury,

bishop of Rochester, resided here, and Dr. Johnson's wife is buried in the church of St. Peter and St. Paul. Near it is Chiselhurst. Pop. 33,000.

Bromoform (CHBr_3) is the bromine analogue of chloroform. It is prepared by similar methods to chloroform, and is a very heavy liquid (sp. gr. 2.8; m.p. $7-8^\circ \text{C}$. and b.p. 151°C .), which is insoluble in water, and turns red in the light from separation of bromine. It is used as a heavy liquid, for separating and determining the density of minerals, and also to a slight extent in medicine.

Brompton. See LONDON.

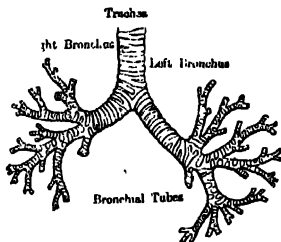
Brömsebro, a small hamlet on the E. boundary of Småland and Blekinge, Sweden, 30 m. S.W. of Kalmar, till 1650 the boundary between Denmark and Sweden. Here treaties of peace were signed between these countries in 1541 and 1645.

Bromsgrove, par. (11,302 ac.) and mkt. tn., Worcestershire, England, 13 m. S.W. of Birmingham. The chief industry is the manufacture of nails, cloth, and buttons. The Midland Railway Company has works here. The grammar school was founded by Edward VI. in 1553. Birmingham sanatorium stands in the northern part of the parish. Pop. 8,500.

Bromwich. See WEST BROMWICH.

Bronchi, BRONCHITIS, BRONCHIECTASIS, etc. The windpipe divides into the right and the left bronchus opposite the fifth dorsal vertebra. The right bronchus is about one inch, and the left nearly two inches in length; they lead from the trachea to the right and left lung respectively. The bronchi are tubes of fibro-elastic membrane, within the layers of which are embedded a series of cartilaginous rings, which go round about two-thirds of their circumference,

the interval between the rings being bridged over by the fibrous membrane in which they are enclosed. Within the tube, at the back, is a layer of unstripped muscular fibres, which extend transversely between the cartilaginous rings to which they are attached. Outside these are a few longitu-



The Bronchi.

dinal bundles; and beneath the mucous membrane is a distinct layer of unstripped muscle, the *muscularis mucosa*. Lining the tube is the mucous membrane, covered with ciliated epithelium. On entering the lungs the bronchi divide and subdivide into smaller branches or bronchioles, which penetrate into every part, until at length they end in the small subdivisions of the lungs called lobules. As the subdivisions become smaller and their walls thinner, the cartilaginous rings become scarcer and more irregular, until, in the bronchioles, they are represented only by minute and scattered cartilaginous flakes.

BRONCHITIS is inflammation of the bronchial mucous membrane, with cough, preceded by a rigor, and followed or accompanied by more or less fever, alteration of the voice, soreness of the chest, and subsequent expectoration of cell-containing mucus, often purulent. When the ultimate divisions of the bronchial tubes in the whole or part of the lungs

are inflamed, the disease is called capillary bronchitis, which is commoner in children than in adults. There are fever, flushed face, hacking cough, dyspnoea. Chronic bronchitis usually results from neglected acute attacks, so that a bronchial attack comes on every winter, each worse than the last. Emphysema, phthisis, heart disease, irritants, gout, and alcoholism are other causes. These attacks usually result in emphysema, dilatation of the bronchial tubes, dilated right heart, and subsequent disorder of the liver and kidneys, if these troubles are not already present. The expectoration is usually mucopurulent, sometimes fetid; occasionally there is none.

Treatment consists in removal of any mechanical irritant, relief of any pre-existing disease, inhalations of warm, moist, soothing air (e.g. from a bronchitis kettle), stimulants, counter-irritation, the use of expectorants (such as carbonate of ammonia, ipecacuanha, potassium iodide, and squills), and, in severe chronic cases, residence in a dry, warm, equable climate, such as that of the Canaries. When accumulation of phlegm threatens asphyxia, the inhalation of vapour of turpentine is strongly recommended. Foreign bodies in the bronchi are dealt with under TRACHEA.

BRONCHIECTASIS is the morbid dilatation of one or more bronchi, accompanied by occasional coughing up of offensive purulent or mucopurulent sputum. It may be confounded with a tuberculous cavity, but the tubercle bacillus will not be found in the sputum; temperature, though often above normal, is not likely to be as high as in tubercle; night-sweating is less severe; and the course of the disease tends to be more chronic.

Treatment is on the lines of antiseptics, and that most strongly ad-

vocated for the average case is by the daily use of creosote vapour baths. The operation of removing portions of ribs (resection) and incising the lung to empty the dilatation is sometimes performed.

BRONCHOCELE. See GOITRE.

BRONCHOPHONY, the effect produced on the voice sounds, when heard through the stethoscope, in cases of consolidated lung—e.g. pneumonia. The sound is as if the patient were speaking directly into the stethoscope.

Brøndsted, PETER OLUF (1780-1842), Danish scholar, born at Fruering, near Horsens, in Jutland. Between 1810 and 1812 he excavated the buried art treasures of Greece. He became professor of philosophy in Copenhagen in 1813, and, after further travels, superintended in Paris the publication of his writings. His chief work, *Travels and Researches in Greece*, appeared simultaneously in French and German (1826-30).

Brongniart, ALEXANDRE (1770-1847), French naturalist, mineralogist, and geologist, the friend of Cuvier, was born at Paris. After serving as druggist in the army, and as mining engineer, he became in 1800 director of the Sèvres porcelain manufactory, in 1818 chief engineer of mining, and in 1822 professor of mineralogy. Among his numerous works were studies on the geology of the environs of Paris (with Cuvier, 1811; 3rd ed. 1835); on the geology of the Apennines and Alps (1821-2), and of Sweden (1829); *Tableau des Terrains qui composent l'Ecorce du Globe* (1829); and *Traité des Arts Céramiques ou des Poteries* (1844; 2nd ed. 1854).—His son, ADOLPHE THÉODORE (1801-76), was appointed professor of botany at the Jardin des Plantes, and was the pioneer in France of the study of vegetable physiology, and author of a treatise on vegetable fossils (1828-37).

B. oni, *tn.*, prov. Pavia, Italy, 23 m. w. of Piacenza. Here Prince Eugene defeated the French in 1713. Pop. 6,800.

Bronkhorst Spruit (*Du. spruit*, a 'rivulet' or 'tributary stream'), 40 m. s. of Pretoria, in the Transvaal, was the scene of a treacherous Boer ambush in the war of 1880, when a British detachment of 250 men was shot down before the declaration of war.

Bronn, **HEINRICH GEORG** (1800-62), German naturalist and botanist, was born at Ziegelhausen, near Heidelberg. He was professor (1828) of natural history and director of the geological and zoological collections of Heidelberg University. Of his numerous writings, which are mainly geological, the chief are *Lethæa Geognostica* (1837-8; new ed. 1876), *Geschichte der Natur* (1841-9), and *Allgemeine Zoologie* (1850).

Bronte, a *mrkt. tn.*, prov. Catania, Sicily, on the w. slope (2,600 ft.) of Mt. Etna, 32 m. N.W. of Catania, is surrounded by chilled lava-flows. Pop. 20,000. It gave the title of 'duke' to Nelson, to whom Ferdinand IV. of Naples granted it (1799), and also the estates belonging to the former Benedictine monastery of Maniacium (5 m. N. of Bronte), founded in 1174. Here the Greek general Maniaces, with Norman help, defeated the Saracens in 1040.

Brontës, **THE**. Charlotte Brontë, afterwards Nicholls (1815-55), was one of the six children of Patrick Brontë, an Irishman, who began life as a handloom weaver, but at sixteen became a teacher, and proceeded in 1802 to St. John's College, Cambridge. Leaving Cambridge, Patrick Brontë became incumbent of Thornton, near Bradford, in 1815. In 1820 he became perpetual incumbent of Haworth, near Keighley, where he remained until his death, in 1861. At Thornton, on April 21, 1816,

iv.

Charlotte Brontë was born, her only brother, Patrick Branwell Brontë, being born there also, in July of the following year; a younger sister, Emily Jane, on July 30, 1818; and the youngest child, Anne, on Jan. 17, 1820.

In January 1831 Charlotte Brontë was sent to school at Roe Head, near Huddersfield, her schoolmistress being Margaret Wooler. Here she gained the friendship of Ellen Nussey (1817-97) and Mary Taylor (1817-93), two friends with whom she regularly corresponded until her death, and whom she frequently visited in their homes—Ellen Nussey at Birstall, and Mary Taylor at Gomersal. Charlotte Brontë left Roe Head in 1832. In 1835 Branwell went to London, ostensibly to study art; and Charlotte, then little more than nineteen years of age, returned to Margaret Wooler's school at Roe Head as a teacher. Emily accompanied her as a pupil, but home-sickness compelled the almost immediate return of the latter, and Anne took her place at Roe Head. In January 1837 Margaret Wooler's school was removed from Roe Head to Dewsbury Moor, three miles distant, and here Charlotte and Anne remained until May 1838. A little earlier Emily had gone as teacher to a school at Law Hill, Southowram, near Halifax; but after less than six months of uncongenial work, she returned to Haworth in a state of great bodily prostration.

In June 1838 Charlotte received an offer of marriage from the Rev. Henry Nussey, the brother of her friend Ellen, whose character is probably presented in the St. John of *Jane Eyre*. She refused him, and a few months later we find her as nursery governess to Mrs. Sidgwick at Stonegappe, Yorks; while Anne occupied the same position to a Mrs. Joshua

Ingham at Blake Hall, Mirfield.

After some months at home Charlotte took up a second situation as governess with a Mrs. White at Rawdon, Yorks. But here again her temperament and environment did not admit of much happiness, and negotiations were soon entered into to persuade the aunt to advance some money to permit of Charlotte and Emily obtaining a competent knowledge of French on the Continent. The school of a Madame Héger, in the Rue d'Isabelle, Brussels, being decided upon, in February 1842 the two girls took up their residence with the Hégers. The husband of the schoolmistress, Professor Héger, it is generally understood, largely did duty afterwards for the portrait of Paul Emanuel in *Villette*.

Charlotte remained at the Brussels *pensionnat* until January 1844, Emily having returned to Haworth in October 1842. Anne meanwhile remained as governess at Thorpe Green, in the house of a clergyman named Robinson, where Branwell also was pupil teacher. In 1846, however, all three sisters were back at Haworth, and in that year published a joint volume of poems under the title of *Poems by Currer, Ellis, and Acton Bell*. The book naturally excited but little attention, only two copies being actually sold, although brief reviews appeared in the *Athenæum* and other publications.

Notwithstanding this discouragement, all three sisters then, apparently for the first time, acknowledged to one another that they had each written a story—Charlotte one under the title of *The Professor*; Emily, *Wuthering Heights*; and Anne, *Agnes Grey*. The stories of the two younger sisters appeared simultaneously in December 1847.

The Professor—originally called *The Master*—was rejected, but with a request that a longer novel in three volumes, then in progress, to which Charlotte had referred in submitting *The Professor*, might be forwarded for consideration. The result was the dispatch of *Jane Eyre*, which was published in October 1847. The story was an instant success, and completely altered the trend of Charlotte Brontë's life, for it brought her into correspondence with Smith Williams, George Smith, Thackeray, Miss Martineau, and a number of other people well known in the literary world. In 1848 Anne Brontë published a second work in three volumes, *The Tenant of Wildfell Hall*, by Acton Bell.

On Sept. 28, 1848, Branwell Brontë died. His career had been an unfortunate one. He had in turn occupied himself as an artist, as a railway booking-clerk, and as a private tutor; but his reckless predilection for alcohol and opium occasioned his early death.

Meanwhile Emily was dying of consumption, and on December 19 of that same year she was laid to rest by the side of her brother in the vault of Haworth church. Anne also was dangerously ill, and in the following spring Charlotte accompanied her to Scarborough, and there the author of *Agnes Grey* and *The Tenant of Wildfell Hall* died, on May 28, 1849.

In September 1849 Charlotte Brontë completed *Shirley*, and it was published in the following month, in many aspects the heroine being, it is believed, the prototype of Emily Brontë. Charlotte was now famous, and associated freely with her literary equals. She met Thackeray in London, visited Harriet Martineau at Ambleside, corresponded with George Henry Lewes and others, and sat for her portrait to Rich-

mond. In the following year she was again in London for the Great Exhibition. In 1852 she was occupied with *Villette*, which appeared the following year. In 1853, also, she visited London again, and her friend Mrs. Gaskell in Manchester. In June 1854 she married her father's curate, Arthur Bell Nicholls, an Irishman of Scotch extraction. After the marriage Nicholls continued to assist his father-in-law in parish work, and his wife made two or three ineffectual efforts to write yet another novel; but *Villette* was to be her last as well as her best story. She died on March 31, 1855.

The Professor, her first novel, was published after her death, with a brief introductory note by her husband. A bibliography on the Brontës is given in the Haworth edition of Mrs. Gaskell's *Life of Charlotte Brontë* (1857), an acknowledged classic, particularly valuable for its footnotes. Supplementary biographical material may be found in *Charlotte Brontë and her Circle* (1896) and *The Brontës: Life and Letters* (1908), both by Clement Shorter; and *The Father of the Brontës* (1897), by W. W. Yates. The Brontë Society publishes useful transactions, bibliographies, etc. The best criticism is by A. C. Swinburne, entitled *A Note on Charlotte Brontë* (1877). Sir Leslie Stephen, Sir John Skelton, Sir Wemyss Reid, Mr. Augustine Birrell, and Sir W. Robertson Nicoll are among those who have written with insight concerning the Brontës. The most recent essay of importance is one by Mary Duclaux, in *Grands Écrivains d'outre Manche* (1901). Madame Duclaux (A. M. F. Robinson) also contributed a biography of Emily Brontë to the 'Eminent Women Series' (1883).

Brontometer ('thunderstorm-measurer'), a combination of meteorological instruments designed to facilitate the study of thunderstorms. The recording part of the instrument consists of a drum about 12 in. wide, on which is coiled endless paper fed by a clock which causes the paper to travel at the rate of 12 in. per minute, or 6 ft. per hour. Pressing on the paper are several pens connected with various automatic meteorological apparatus. These pens register in aniline ink the velocity of the wind, the rainfall, and the atmospheric pressure. Other pens, worked by keys, enable the observer to record the exact time of thunder or lightning, and the duration and intensity of hail. See Symons, 'On the Brontometer' (*Proc. Roy. Soc.*, vol. xlviii. p. 59).

Brontotheriidae, gigantic extinct ungulate animals, the remains of which have been found principally in N. America. They occur in Eocene and Miocene strata, and indicate an animal intermediate in size between an elephant and a rhinoceros. The front foot had four digits, the hind foot three; from the shape of the skull it is probable that they had a long, flexible nose, though not a true prehensile proboscis. The type genus of the family is known as *Titanotherium*. See H. N. Hutchinson's *Extinct Monsters* (1892), and Smith Woodward's *Vertebrate Palaeontology* (1893).

Bronx, THE, since 1898 one of the five boroughs which constitute New York City. It lies N. of Manhattan, between East R. and Long Island Sound and the Hudson R., and has an area of 39 sq. m., and pop. of 300,000. Bronx Park contains an important botanical garden as well as a zoological garden.

Bronze, an alloy of copper, 80 to 90 per cent., and tin, 20

to 10 per cent.; the tin may be partly replaced by lead and zinc. *Phosphor bronze*, much used for the working parts of machines and for telephone wires, contains about one-fifth per cent. of phosphorus, which greatly increases its hardness and tenacity. Similar alloys are obtained by the addition of small quantities of manganese and silicon. Bronze was one of the chief metals of antiquity. In modern times it has been used for the manufacture of cannon, though for this purpose it is now superseded by steel; for coins; as bell metal, on account of its resonance; and for casts of statues, busts, etc., because of its fine colour both when clean and when oxidized by the weather.

Bronze Age. The term 'age,' when applied to implements of stone, bronze, and iron, is no longer interpreted by antiquaries to denote an absolute division of time, but a condition of culture. Originally based on the assumption that the 'ages' of stone, bronze, and iron constituted three consecutive chronological epochs, there can be no doubt that this ill-chosen terminology has led to much misconception in matters archaeological. Weapons of stone are still, in the popular mind, of necessity more ancient than those of metal. In direct opposition to such belief comes the theory of Paul Bataillard. This theory is partly based upon the fact that in Polish Galicia there is a caste of people called *zlotars*, who work in bronze to the exclusion of iron, and whose utensils would therefore be described (archæologically) as 'belonging to the bronze age,' and themselves as 'living in their bronze age,' although chronologically they are people of the 20th century, and their utensils of 20th-century manufacture. Bataillard further

believed that people of the same race as these *zlotars*, who are gypsies, introduced bronze into Europe (see his *L'Importation du Bronze dans le Nord et l'Occident de l'Europe par les Tsiganes*, Paris, 1878); and Francis H. Groome pointed out that Lord Avebury was led, in 1865, to the conclusion that the first bronze-workers in Europe were an Eastern people, small-handed and nomadic, like the Egyptians or the Hindus. 'Bataillard's theory,' adds Mr. Groome, 'is gaining favour with foreign archaeologists, among whom MM. Mortillet, Chantre, and Burnouf had arrived independently at similar conclusions.' (For fuller information on this subject, see F. H. Groome's *Gypsy Folk-Tales*, 1899, pp. 22-32.) It would seem, therefore, that although bronze has been manufactured from very ancient times, its existence in Europe ought to be associated with a certain race. Dr. Robert Munro has made the deduction that the use of the horse as a domestic animal in Britain synchronizes with the use of bronze implements; and this deduction, if made applicable to the Continent, would accord well with the belief that bronze came into Europe with a race of horsemen. Professor Stephens of Copenhagen states that, as early as the 10th century B.C., Asiatic caravans traded to and from the Baltic, and that the Assyrian bronze *sabre* found (c. 1875) at Nardi, in Arabia, is almost the counterpart of a bronze *sabre* found in Heda parish, Östergötland, Sweden, and now in the Stockholm Museum. 'A primeval centre of diffusion for bronze seems to have existed in the home of the civilized Sumero-Accadian people,' observes Dr. O. Schrader, who cites the following conclusion of Lindenschmit: 'The so-called bronze period appears, then, to

have been nothing but a time of active commercial and industrial intercourse between the Mediterranean peoples and those of the North. The products carried north show no indication whatever that they were the outcome of the native capacity of the Celto-Toutons; are related with earlier native creations; or that they were developed or grew into anything subsequent.' The opposite view has been more or less strongly advocated by Sophus Müller, Undset, Rygh, Hildebrand, John Evans, Anderson, and others. See Lord Avebury's *Prehistoric Times* (1900).

Bronze Statuary. The very ancient art of representing figures in bronze may be studied under the four varieties dependent upon the methods employed. 1. *Epithema*, solid casts in moulds, were probably the earliest; they were certainly known in Egypt. 2. *Sphyrelata*, figures constructed of beaten plates of bronze riveted together, were characteristic of Etruscan and Grecian art. 3. *Emblemata*, figures obtained by beating up or embossing the metal into high relief in a mould. 4. Hollow casts, formed on a mould of sand. (See CASTING.) A great antiquity is claimed also for this variety. Among famous masterpieces may be mentioned (a) the Etruscan Chimæra, found at Arezzo, and now in the Uffizi Gallery at Florence, and the Wolf of the Capitol at Rome. (b) Grecian bronze statuary reached its zenith between 460 and 430 B.C. The colossal Athene crowning the summit of the Acropolis was the greatest work of Phidias. (c) The Romans were rather patrons than producers of this art; and their lavish love of it is instanced by Pliny, who tells of Scaurus, stepson of Sulla, having 3,000 bronze statues used for the decoration of a temporary theatre. There is a statue of Nero by Zenodorus, 115 ft. in

height. (d) Of mediæval examples, the statue of St. Peter at Rome, ordered by Leo I., ranks as one of the greatest achievements. Italy, indeed, was the home of the art, for proof of which we need but notice such works as the *albero*, the great candlestick of Milan Cathedral, the wonderful gates to the baptistery of Florence (the twenty-one years' labour of Lorenzo Ghiberti, completed in 1424), and Verrocchio and Leopardi's equestrian statue of Bartolomeo Coleoni in 1496.

In Germany and France monumental sculpture in bronze is comparatively rare; but among the artists who produced fine ecclesiastical furniture were Labenwolf, the Vischers, Muschgat, Hack, and Neidthard. Of the English school, the best craftsmen, who worked in stone and wood as well as in bronze, were Grinling Gibbons, Sir H. Cheesc, Francis Bird, John Bacon, R.A., Sir R. Westmacott, and Chantrey. See *Bronzes of European Origin in S. Kensington Museum*, by C. D. E. Fortnum (1876). See also METAL DECORATIVE WORK.

Bronze-wing, a name applied to certain Australian pigeons in which the wings show metallic spots and patches. The common bronze-wing of the colonists is *Phaps chalcoptera*. See PIGEON.

Bronzing, the process of giving a metallic or iridescent appearance to metal and other articles either by the application of a chemical bronzing solution, or by dusting bronze powder on a surface previously prepared by coating with linseed-oil varnish. There are several bronzing solutions in use, some of the simplest being the following: for brown to black shades, five drams of nitrate of iron or five drams of perchloride of iron to one pint of water; for olive-green, one pint of permuriate of iron to two pints of water; for blue, twenty drams of hypo-sul-

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phite of soda to one pint of water; for steel-gray, one ounce of muriate of arsenic to one pint of water. The article to be bronzed must be first cleaned by washing with strong acids or potashes before immersing in the chemical solution or otherwise applying it. Bronzing-machines are used for varnishing, dusting with bronze powder, and finishing the surfaces of wall-papers, fabrics, labels, etc.

Bronzino, IL (1502-72), the name given to AGNOLO DI COSIMO, Italian painter of the Florentine school in its decline, born at Monticelli, was the favourite pupil of Pontormo and friend of Vasari. His reputation rests on his careful portraits of prominent Florentines of his day. Perhaps his best-known work, *Christ's Descent into Hell* (Uffizi, Florence), influenced by Michael Angelo's *Last Judgment*, is artificial and crowded in arrangement. The portraits of Piero and Cosimo de' Medici, of a boy, of a lady, and of a knight of St. Stephen, as well as the allegory *Venus, Cupid, Folly, and Time*, are in the National Gallery, London, and a fine portrait of Eleonora di Toledo is in the Wallace Collection, London. See Ruskin's *Modern Painters*; Sir E. J. Poynter's *Classic and Italian Painting* (1880).

Bronzite, so called from its sub-metallie lustre resembling tarnished bronze, is one of the pyroxenes, belonging to the subdivision which crystallize in the rhombic system. It is a fairly common ingredient of igneous rocks. (See *HYPERSTHENE*.) Its lustre is due to the reflection of light from the surface of minute metallic enclosures.

Brooch, an ornament fastened to clothing by a safety-pin. Several types are distinguished: the Roman bow-shaped *fibula* of various metals; the Celtic, usually of bronze, exhibiting extraordinary knowledge of metal-work,

and rare taste in the application of zoomorphic decoration and enamelling; the Viking type, an oval, bowl-shaped brooch with vaguely zoomorphic decoration, cut out of the solid bronze; the Scottish Highland, consisting of large flat bands of metal ornamented with grouped designs of interlaced and scroll patterns; and the Luckenbooth, usually small, heart-shaped, in copper, silver, and gold fancifully set with gems. Of more general mediæval forms may be mentioned the great clan brooches of precious metals set with crystal spheres and jewels, and the small gold brooches frequently inscribed with mottoes in French black-letter. See J. Anderson's *Scotland in Pagan Times* (1881), *Scotland in Early Christian Times* (1881), and Heaton's *Brooches of many Nations* (1904).

Brooke, HENRY (?1703-83), Irish author, published his first work—*Universal Beauty*, a poem—in 1735. He wrote several tragedies—e.g. *Gustavus Vasa* (1739), *The Earl of Westmoreland* (1745), and *The Earl of Essex* (1749). Though anti-Catholic in his views, Brooke wrote a *Trial of the Cause of the Roman Catholics* (1761). His novel, *The Fool of Quality*, was republished by Charles Kingsley (1859).

Brooke, SIR JAMES (1803-68), best known as the Rajah of Sarawak, was born at Benares. In 1819 he entered the East India Company's army, and was seriously wounded in the Burmese war of 1826. Proceeding to Borneo in 1838, he aided the sultan of Brunei to reduce the marauding Dyak tribes of Sarawak, and with such success that the sultan created him rajah of the province of Sarawak in 1841. The island of Labuan, near Sarawak, having been purchased from Borneo by the British government, Brooke, who had been knighted in 1847, was appointed

governor of the island and commander-in-chief. His subsequent suppression of the pirates was so severe that he was attacked in the House of Commons in 1851, but exonerated; and finally the independence of Sarawak was recognized (1847) by the British government. Brooke died at Burrator, Devonshire—an estate purchased for him by public subscription—June 11, 1868. He was a fine specimen of the old type of Elizabethan adventurers so far as that type can be reproduced in a later age. See Temple's *Private Letters of Sir James Brooke* (1853); Munday's (1843) and Koppel's (1845) *Journals*; Jacob's *Raja of Sarawak* (1876); and St. John's *Life of Sir James Brooke* (1879). James Brooke was succeeded by his nephew, SIR CHARLES JOHNSON BROOKE (b. 1829), who rules over a larger territory than his uncle—the Limbang River district having been annexed in 1890, and an earlier accession having been made in 1885.

Brooke, LORD. See GREVILLE, FULKE.

Brooke, STOPFORD AUGUSTUS (1832), Irish man of letters, born at Letterkenny, Co. Donegal, Ireland, became minister of St. James's Chapel, York Street, London, in 1866, and was appointed a chaplain-in-ordinary to Queen Victoria (1872); but in 1880 he seceded from the English Church, owing to his scepticism in regard to the doctrine of the incarnation. He has written *Life and Letters of the late Frederick W. Robertson* (1865); *Sermons*, collected in 4 vols. (1868-77); *Theology in the Eng. Poets* (1874); *Primer of Eng. Lit.* (1876), a concise and useful little book; *Riquet of the Tuft: a Love Drama* (1880); *Poems* (1888); *Hist. of Early Eng. Lit.* (1892); *Tennyson: his Art* (1894); *Life and Writings of Milton* (Primers of Eng. Lit., 1898); *Early Eng. Lit.*, in Macmillan's

series, uniform with Saintsbury's *Elizabethan Lit.* (1899); *The Poetry of Browning* (1902); *Ten Plays of Shakespeare* (1905); *Studies in Poetry* (1907); and *Four Poets* (1908).

Brook Farm, farm, W. Roxbury, 10 m. s.w. of Boston, Mass., U.S.A. Here an unsuccessful experiment of farming on Fourier's socialistic principles was undertaken in 1841 by the Brook Farm Association, under the leadership of Ripley, and embracing Nathaniel Hawthorne, Alcott, G. W. Curtis, W. B. Channing, Margaret Fuller, and C. A. Dana. The project proved a financial failure, and the community was disbanded in 1847. It is described in Hawthorne's *Blithedale Romance* (1852). See also Codman's *Brook Farm Memories* (1849), Russell's *Home Life of the Brook Farm Association* (1900), and Swift's *Brook Farm* (1900).

Brookfield, tn., Linn co., Missouri, U.S.A., on Yellow Creek, 95 m. E.N.E. of Kansas City; has iron foundries and engine works. Coal is mined in the vicinity. Pop. 5,500.

Brooklime (*Veronica Beccabunga*), a plant belonging to the Scrophulariaceae, occurs throughout Europe, N. and Central Asia, and N. Africa, but does not enter the Arctic circle. It is abundant in Britain, where it is found growing in wet ditches, and on the margins of streams and ponds, in shallow water. The plant is devoid of hairs, and is very succulent. The stems, creeping on the surface of the mud, and rooting at the nodes, bear pairs of opposite leaves, from the axils of which flowering shoots arise. The flowers are bright blue, rather small, and arranged in pairs of opposite axillary racemes, not much longer than the subtending leaves. The plant had at one time a reputation as a spring salad and antiscorbutic.

Brookline, vil., Norfolk co., Mass., U.S.A., is 4 m. s.w. of Boston, of which it is a residential suburb. Pop. 28,000. See Bolton's *Brookline* (1897).

Brooklyn. See NEW YORK.

Brooks, CHARLES WILLIAM SHIRLEY (1816-74), was editor of *Punch*, and for a time parliamentary reporter for the *Morning Chronicle*, leader writer to the *Illustrated London News*, conducted the *Literary Gazette* (1858-59), and edited *Home News* after Robert Bell's death in 1867. He also contributed occasional pieces to the stage. He published the novels *Aspen Court* (1855), *The Gordian Knot* (1860), *The Silver Cord* (1861), and *Sooner or Later* (1868); also a book of travels, *The Russians of the South* (1856). From 1851 he contributed to *Punch* under the signature 'Epicurus Rotundus,' and in 1870 became editor. He initiated the articles headed 'The Essence of Parliament.' See *Life* by G. S. Layard (1907).

Brooks, PHILLIPS (1835-93), American divine and author, born at Boston, Mass., was an Episcopal clergyman in Philadelphia (1859-69), and afterwards in Boston, and was appointed bishop of Massachusetts in 1891. A spiritually-minded man and a powerful orator, his preaching was very popular and influential. He published *Sermons* (1878), *The Influence of Jesus* (1879), *Sermons Preached in English Churches* (1882), *Literature and Life* (1886), and other works. See *Life* by A. V. G. Allen (1901).

Brooks's Club. See ALMACK'S.

Brookweed (*Samolus Valerandi*), a small, almost cosmopolitan, herbaceous plant, belonging to the Primulaceæ. It abounds in marshes near the sea. Small white flowers are borne in racemes on a slender stem springing from the centre of a rosette of bright green leaves.

Brookwood, part of par. of Woking, Surrey, from which it is distant 4 m. w. It is chiefly noted for its asylum for pauper lunatics; and the necropolis, formed in 1854. A crematorium was erected here in 1889.

Broom. The common broom (*Sarothamnus scoparius*, *Cytisus scoparius*) is an evergreen shrub about three feet or more in height, with numerous straight twig-like branches, small ternate leaves, and large yellow papilionaceous flowers, followed by dark-brown pods. It thrives in dry sandy soil. The *Planta genista*, which gave its name to the line of Plantagonet, was the broom. *Scoparii cacumina*, or broom tops, have long held high place as a drug, and the decoction prepared therefrom is still used as a diuretic in certain conditions.

Besides the broom which occurs wild in Britain, many other kinds afford beauty to English gardens. The yellow-flowered *Cytisus nigricans*, which blooms at midsummer; the deciduous *C. biflorus*, which bears pairs of yellow flowers in May; the white-flowered *C. albus* from Portugal; Ardoine's broom (*C. Ardoinei*), which is a tufted little plant only four inches high; and the purple broom (*C. purpureus*), are among the best of the hardy sorts; while *C. canariensis*, *C. racemosus*, and *C. filipes* are specially worth growing as greenhouse plants. A soil composed of four parts loam, one part peat, and one part sand suits these well. After flowering, the greenhouse species should be cut back and kept in a warm house till growth has well started. Then the plants should be kept cool until the opening months of the following year. Propagation is best effected by cuttings of the young wood taken in spring and placed in heat.

The use of broom twigs for the making of brooms or besoms is

very old; they have also been used for thatching houses; and the flower-buds are said to have some virtue as a pickle. See *Hulme's Wild Fruits of the Countryside* (1902).

Broom. See BRUSHES.

Broom Corn (*Sorghum vulgare*), an E. Indian reedlike grass cultivated in the United States, and used for making brooms; the seeds afford a food for cattle.

Broome, small scapt., w. coast, Dampier Land, Kimberley div., W. Australia, about 18° s.; headquarters of the pearl-fishing industry. Pop. 600.

Broome, SIR FREDERICK NAPIER (1842-96), British colonial statesman, born in Canada, but went to New Zealand (1857-69) in early youth. He was colonial secretary of Natal (1875) and of Mauritius (1877), governor of W. Australia (1882), of Barbados (1890), and of Trinidad (1891). His wife, Mary A. Stewart, a native of Jamaica, has written *Station Life in New Zealand* (1869).

Broome, WILLIAM (1689-1745), translator, was born at Haslington, Cheshire. In 1712 he collaborated in a prose translation of the *Iliad*, and was employed by Pope in annotating his own translation. In 1722 Pope proposed to Broome and his friend Elijah Fenton to join him in translating the *Odyssey*. Broome did the 8th, 11th, 12th, 16th, 18th, and 23rd books, and all the notes. See Johnson's *Lives of the Poets* (1779-81). For his quarrel with Pope, see Elwin and Courthope's *Correspondence of Pope* (1871-89).

Broom Rape (*Orobanchæ*), a genus of plants with about 180 species, belonging chiefly to the temperate regions, all parasitic on the roots of other plants—e.g. broom, hemp, tobacco, ivy. They are brightly coloured plants, but bear no green leaves, having scales instead.

IV.

Brora Coals. See OOLITE.

Brosböll, KARL. See CARIT ETLAR.

Brosch, MORITZ (1829-1907), German historian, born at Prague, was a journalist there and at Vienna until 1873, when he removed to Venice and devoted himself to historical studies. He wrote *Papst Julius II und die Gründung des Kirchenstaats* (1878), *Geschichte des Kirchenstaats* (2 vols. 1880-2), *Lord Bolingbroke und die Whigs und Tories seiner Zeit* (1883), *Oliver Cromwell und die Puritanische Revolution* (1886), and the continuation of Ippenbergl-Pauli's *Geschichte von England* (1890-7).

Broschi, CARLO. See FARINELLI.

Broseley (2,006 ac.), par. and mkt. tn., Shropshire, England, on G.W.R., 15 m. S.E. of Shrewsbury; has coal mines, and important trade in glazed tobacco-pipes (chiefly 'churchwardens'), bricks, and tiles. Pop. 4,000.

Brotherhoods, associations of men of the same profession, society, fraternity, or religious order. The chief religious brotherhoods were the fraternities known as the Brothers of Mary, of the Scapular, of the Rosary, of the Sacred Heart, and of Francis Xavier. These were followed by the *Fratres Pontifices* (whose duties were mainly confined to looking after travellers in the neighbourhood of bridges and ferries), and the *Familiares* and *Cross-bearers*, identified with the Spanish Inquisition. The later brotherhoods were founded in the Netherlands and N. Germany, and they spread over the Continent rapidly, till, in the middle of the 15th century, their number was reckoned at over 150. During the last two centuries there has been a large growth of brotherhoods in the Roman Catholic Church. There are also several brotherhoods in connec-

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tion with the Church of England. See CHRISTIAN BROTHERS and BRETHREN, APOSTOLIC.

Brothers, RICHARD (1757-1824), a British naval officer, born in Newfoundland. About 1793 he began to describe himself as the 'nephew of the Almighty,' prophesied his own 'revelation,' on Nov. 19, 1795, as prince of the Hebrews and ruler of the world, and the rebuilding of Jerusalem in 1798. He was arrested and confined in a lunatic asylum in 1795. Nathaniel Brassey Halhed, M.P. for Lymington, to whom Brothers had promised the government of India, attempted to raise his case in Parliament. In 1806 Brothers was released, and was taken charge of by John Finlayson, a Scottish writer, who had given up a lucrative practice at the bar to follow him. In 1794 he published a book of 'prophecy,' *A Revealed Knowledge of the Prophecies and the Times*, which led many to believe in him.

Brötzingen, tn., Baden, Germany, 2 m. w. of Pforzheim. Pop. 6,500.

Brough, LIONEL (1836-1909), English actor, born at Pontypool, Monmouthshire. He began life as a clerk to John Timbs, editor of the *Illustrated London News*, and afterwards was on the staff of the *Daily Telegraph*, when he originated the present system of selling newspapers in the streets. He made his first appearance on the stage at the Lyceum Theatre, London, under the management of Madame Vestris (1854). In 1858 he left the stage for five years, during which time he was engaged on the staff of the *Morning Star*. In 1863 he returned permanently to the stage, and figured prominently as a low comedian. But he had also a special gift for the interpretation of some of Shakespeare's humorous characters, as was seen in his Sir Toby Belch in *Twelfth Night* at His Maj-

esty's Theatre (1901). Some of his later rôles were the Host of the 'Garter' in *The Merry Wives of Windsor* at His Majesty's (1908), and Lauterbach in *Into the Light* at the Court (1908).

Brougham, HENRY, BARON BROUGHAM AND VAUX (1778-1868), was born in Edinburgh, and called to the Scottish bar in 1800; but owing to his pronounced Whig and Liberal sympathies, and to a reputation for eccentricity and rashness, met with comparatively little success as an advocate, and in 1805 migrated to London, where he permanently settled, being called to the English bar in 1808. In 1802 he joined with Jeffrey and others in founding the *Edinburgh Review*. To the first twenty numbers he contributed no fewer than eighty articles; and the encyclopædic character of his learning, which included natural philosophy and mathematics, natural theology and metaphysics, besides politics and history, was displayed in these early contributions.

At the English bar he contrived to make a great reputation by his success in some celebrated cases, the first of which was as counsel of the Liverpool merchants who petitioned against the Orders in Council which formed part of the commercial war between England and Napoleon. This was in 1810; and soon after he entered the House of Commons, where his turbulent and aggressive eloquence secured him a ready welcome from the opposition. Brougham was a tireless advocate of slave emancipation, of political reform, of law reform, of national education, and of religious equality. Among other projects which he helped to start were the University of London in 1825, and the Society for the Diffusion of Useful Knowledge (1827). He also made a great reputation for him-

self as a champion of popular rights by his speeches in defence of persons prosecuted by the crown for libel. His *cause célèbre* was his defence of Queen Caroline in 1820, which so endeared him to the English people that for the next ten years he was almost a popular idol. One of his many escapades was to circulate the rumour of his death, that he might read his own obituary notices. In 1830 he was made Lord Chancellor, and was largely instrumental in getting the Reform Bill passed in 1832. Although invaluable in opposition, he was impossible as a colleague in office. He was too turbulent, too vain, too rash; and when the Whig ministry was reconstructed in 1834, Brougham was neither then, nor at any subsequent date, reappointed to office. This inspired him for many years with an intense hatred of Melbourne, who had shelved him. From that time he resided chiefly at Cannes (which he popularized as a health resort), finding in his political exile solace in founding and supporting the Social Science Association (1857). His writings were published in 11 vols. in 1855-61; new ed. 1872-3. His *Memoirs of his Life and Times* (1871) are hardly trustworthy. See Campbell's *Lives of the Chancellors*, Bagehot's *Biographical Studies*, Atlay's *Victorian Chancellors* (1905), and *Brougham and his Early Friends* (1908).

Brougham, JOHN (1814-80). Irish dramatist and actor, was born in Dublin. Besides acting, he undertook theatrical management, first in London and afterwards in New York, but always with disastrous financial results. As an actor he excelled in Irish parts. He wrote over seventy plays, among the best known being *The Duke's Motto*, *Bel Demonio*, *Romance and Reality*, and the burlesque *Pocahontas*.

Broughton, RHODA (1840), novelist, was born in Denbighshire. She started novel-writing with a work entitled *Not Wisely but Too Well* (1867), in which the situations and language attracted attention through their combined originality and audacity. She made her misses men in their sayings and doings, and it may be said that she had a considerable share in the introduction of 'the new woman' into English fiction. At the same time, her characters are closely observed, and depicted with great candour and realism, and she excels in humorous situations. Her other novels are *Cometh up as a Flower* (1867), *Red as a Rose is She* (1870), *Nancy* (1873), *Joan* (1876), *Belinda* (1883), *Dr. Cupid* (1886), *Alas!* (1890), *A Beginner* (1894), *Scylla and Charybdis* (1895), *Dear Faustina* (1897), *The Game and the Candle* (1899), *Foes in Law* (1901), *Lavinia* (1902), and *A Wife's Progress* (1905).

Broughty-Ferry, tn., Forfarshire, Scotland, 3 m. E. of Dundee, on C. and N.B. Joint Ry.; residence of Dundee merchants; seaport and fishing town. Before the erection of the Tay Bridge it was a busy place, being the port for the ferry steamer from the S. side of the Tay. The 15th-century castle is of historic interest, and is still fortified for the defence of the Tay. Pop. 12,000.

Broussa. See BRUSA.

Broussais, FRANÇOIS JOSEPH VICTOR (1772-1838), French physician, was born at St. Malo, and died at Vitry. Imperfectly educated, he served as surgeon through campaigns in Germany, Holland, Italy, and Spain; and also in the navy. Appointed in 1820 professor at the military hospital of Val-de-Grâce, Paris, and in 1831 professor of general pathology at the Academy of Medicine, Paris, he founded a peculiar theory of medicine—*Histoire des*



Christ Washing St. Peter's Feet. By Ford Madox Brown. In the National Gallery of British Art (Tate Gallery) London

Phlegmasies ou Inflammations Chroniques (1808; 3rd ed. 1826), and *Examen de la Doctrine Médicale généralement adoptée* (1816; 4th ed. 1829-34)—in which he defined life as dependent upon irritation, and disease, primarily local in its origin, as excessive or insufficient irritation.

Brouwer, or **BRAUWER**, **ADRIAEN** (?1606-38), Dutch painter, was born of humble parentage at Oudenarde; studied at Haarlem (1626-7) under Frans Hals, a hard taskmaster, from whose cruelties he fled to Amsterdam, and thence to Antwerp (1630), where he was arrested as a spy, but obtained his liberty, according to tradition, by painting a picture which Rubens recognized as the work of a master. A life of dissipation brought him to an early death. His subjects, like those of his countryman Teniers, were chosen from low life—tavern brawls, country feasts, boozers playing cards, etc.—but all executed with admirable expression, brilliant colouring, and exquisite finish and vigour. See *Life* by W. Bode (1884).

Brower, **JACOB VRADENBERG** (1844-1905), American archaeologist, was born at York, Michigan, U.S.A., and made a name for himself as an explorer of his own country. In 1894-5 he discovered mounds and the site of an ancient village at Itasca Lake; in 1897-8 he rediscovered the site of Quivira; and in 1900 he identified over 1,100 ancient mounds at Mille Lac, Minnesota. His written works include *The Mississippi and its Source* (1893), *Prehistoric Man at the Head-waters of the Mississippi* (1895), *Quivira* (1898), *Mille Lac* (1900); *Kansas, Monumental Perpetuation of its earliest History, 1541-1896* (1903).

Brown, **MOUNT**, peak in Rocky Mts., Canada, between Alberta and British Columbia; long reputed the highest peak of the

Rockies, but now estimated to be only 9,055 ft. high.

Brown, **ALEXANDER CRUM** (1838), Scottish chemist, was born in Edinburgh; became extra-academical lecturer in chemistry at Edinburgh University in 1863, and occupied the chair in the same subject in the university (1869-1908). Crum Brown's principal work has been on the relation between chemical constitution and physiological action, the ketines, electrolytic synthesis, and the anatomy and physiology of the semicircular canals of the internal ear.

Brown, **CHARLES BROCKDEN** (1771-1810), the earliest prominent American novelist, was born of Quaker parentage at Philadelphia. His first attempt at literature, *Alcuyn* (1797), a wild speculation on the evils of marriage, was followed by *Wieland* (1798), *Ormond* (1799), *Arthur Mervyn* (1800), *Edgar Huntley* (1801), *Clara Howard* (1801), and *Jane Talbot* (1804). Popular in England for a time, his novels, which were to some extent influenced by Godwin, are characterized by lively diction, but are unreal and improbable in plot and action. A collected edition was published in 1827, with *Life* by Dunlap (new ed. 1887). See W. H. Prescott's *Life of Ch. B. Brown* (1834).

Brown, **FORD MADOX** (1821-93), British historical painter, and pioneer of the pre-Raphaelite movement, was educated in Belgium. He studied painting under Wappers; also in Rome and Paris. His true masters were Holbein and the 15th century Italian masters, from whom he developed his sense of grand style and archaism of form. In 1844 he competed for the wall decorations at Westminster Hall: his designs were the indirect means of bringing him into contact with Rossetti, his pupil and friend, and other members of the pre-

Raphaelite brotherhood. He settled in London in 1846, and both with pen and brush worked to fulfil the aims of the earnest and enthusiastic band, which included Rossetti, Millais, and Holman Hunt. From 1879 he was engaged on a series of mural paintings for the Manchester town hall. That city also possesses a masterpiece, *Work. The Last of England*, another masterpiece, is at Birmingham; *Christ Washing St. Peter's Feet*, in the National Gallery, London. Among his other works are *King René's Honeymoon*, *King Lear*, *Cordelia's Portion*, and *Cromwell at St. Ives*. He also designed cartoons for stained glass for William Morris. See Hueffer's *Life and Letters of Ford Madox Brown* (1896); Sizeranne's *English Contemporary Art* (1898); Chesneau's *English School of Painting* (1884); W. M. Rossetti's *Ruskin, Rossetti, etc.* (1899), and *Pre-Raphaelite Diaries and Letters* (1899); and Helen Rossetti's *F. M. Brown* (1901). See PRE-RAPHAELITISM.

Brown, SIR GEORGE (1790-1865), British general, was born near Elgin, Scotland. He distinguished himself in the Peninsular war (1808-13), and in America (1814), where he fought at Bladensburg and Washington. Sent in command of the Light Division to the Crimea (1854-5), he behaved gallantly at Alma and Inkerman, being severely wounded in the latter battle. In 1860 he became commander-in-chief in Ireland. See A. W. Kinglake's *Invasion of the Crimea* (1899).

Brown, GEORGE (1818-80), Canadian publicist and Liberal leader, born at Edinburgh, Scotland. He settled in Toronto (1843), and entered the Union Parliament (1852). In 1858 he was called upon to form an administration, and he took as its basis the federation of all British provinces. Six years later

he proposed the coalition which effected the present confederation. In 1873 he entered the Senate, and, with the British minister at Washington, negotiated (1874) a reciprocity treaty with the United States, which was accepted by Canada, but failed of ratification by the American Senate. On March 25, 1880, he was shot by a discharged workman, and died on the 9th of the following May. See Mackenzie's *Life and Speeches of the Hon. George Brown*, and Lewis's *Makers of Canada: Hon. George Brown*.

Brown, GEORGE DOUGLAS (1869-1902), Scottish author, was born at Ochiltree, Ayrshire. After graduating at Oxford in 1895, he proceeded to London, and entered on literary and journalistic work. To the public he was entirely unknown until he brought out his novel, *The House with the Green Shutters* (1901), a powerful story of Scottish life, published under the pen-name of 'George Douglas.' A brief memoir of his life appeared in 1903.

Brown, GEORGE LORING (1814-89), American landscape painter, was born at Boston, Mass. After spending twenty years in Europe, he returned to America (1860). His subjects are mainly American and Italian landscapes. His *Crown of New England* was purchased by King Edward VII., who also owns *The Bay of New York* (1860). Other pictures by Brown were *Niagara by Moonlight* (1876), *Doge's Palace, Venice*, and *The Bay of Naples*.

Brown, HENRY KIRKE (1814-86), American sculptor, born at Leyden, Mass., U.S.A. His chief work was the equestrian statue of Washington in New York, which is notable for being the first important piece of bronze statuary in the United States. His statue of Lincoln was a failure, but the equestrian statue of General Scott is a most artistic work.

Brown, HORATIO ROBERT FORBES (1854), writer on Venice, was born at Nice. Has published *Life on the Lagoons* (1884; 5th ed. 1909); *Venetian Studies* (1887); *The Venetian Printing Press* (1891); *Venice, an Historical Sketch* (1893; 2nd ed. 1895); a *Biography of John Addington Symonds* (1895; 2nd ed. 1903); *In and Around Venice* (1905); a translation of Molmenti's *Venice* (6 vols. 1907-8); *Studies in the History of Venice* (1907), etc.; and has edited for the Public Record Office of London the *Calendar of State Papers, Venetian, 1581-1613* (1895-1905).

Brown, JOHN, of Haddington (1722-87), Scottish Presbyterian divine, was born at Carpow, in Abernethy parish, Perthshire. While a herd boy on the Abernethy braes he learned Latin and Greek, and passed ultimately into the Secession ministry. In 1751 he was settled at Haddington, where the remainder of his life was spent. Brown was professor of divinity in the Secession Hall from 1768. Of his writings, entirely theological, the best remembered are *Dictionary of the Bible* (1768), and the *Self-interpreting Bible*, published in two volumes in 1778. He was a man of vast learning, and excelled in Oriental lore. See *Memoirs and Select Remains*, edited by the Rev. W. Brown (1856).

Brown, JOHN (1784-1858), Scottish divine, grandson of the above, and son of the Rev. John Brown of Whitburn (1754-1832)—an author of some repute in his day—was born at Whitburn, Linlithgowshire. He became minister in 1806 of the Secession congregation at Biggar, Lanarkshire, where he remained till 1822, when he was translated to Rose Street church, Edinburgh. In 1829 he accepted a call to Broughton Place church, in the same city. He was mod-

erator of the Associate Synod in 1818, and was professor of exegetical theology to his denomination from 1834 till his death at Edinburgh, Oct. 13, 1858. Dr. Brown was a notable figure in the religious history of his time, a profound theologian, a prolific writer (author of over fifty publications—see list in Mackelvie's *Annals*, 1873), and a preacher of rare eloquence. See Cairns's *Memoir* (1860), and his son's admirable 'Letter to John Cairns, D.D.' in *Horæ Subsecivæ* (1858-1861, 1882).

Brown, JOHN (1810-82), son of the preceding, was born at Biggar, Lanarkshire. Apprenticed in 1827 to Syme, the eminent surgeon, he afterwards settled down to professional life in Edinburgh. Dr. John Brown is the Charles Lamb of Scottish literature. His writings, collected into the three volumes of *Horæ Subsecivæ* (1858-61; new ed. 1882), are among the most charming in the language. He ennobled, as few have done, the humblest things of life. The most popular and incomparably the finest of his productions are *Rab and his Friends* (1859); *Pet Marjorie* (1863); and *Jeems the Doorkeeper* (1864). See Dr. Peattie's *Recollections of Dr. John Brown* (1893); *Dr. John Brown and his Sisters Isabella and Jane* (new ed. 1901); J. T. Brown's *Dr. John Brown* (1903); articles in the *Century* and *Good Words* magazines (1882); Swinburne's sonnet, and *Letters* (1907).

Brown, JOHN (1735-88), a Scottish physician, was educated at Duns, Berwickshire, and studied medicine in Edinburgh. His innovations in medical practice led to his formal ostracism in Edinburgh in 1778, whereupon he removed to London. Here he died, after ten years of poverty. His doctrines, known as the Brunonian system, now medical commonplace, were promulgated in

Elementa Medicinæ (1780), which consisted chiefly in an attack on the indiscriminate use of blood-letting. See *Lives* by W. C. Brown (1804) and Dr. Boddoes (1795), and Häser's *Geschichte der Medicin*, vol. ii. (1884).

Brown, SIR JOHN (1816-96), English steel manufacturer, the son of a slater, was born at Sheffield, and apprenticed to a file and cutlery firm. In 1848 the idea occurred to him of the conical steel buffer spring, which was a profitable invention. After this the business rapidly increased, and was transferred to the Atlas Works (1856), which eventually covered an area of thirty acres. He at once started the manufacture of wrought iron for steel-making, and by an agreement with Bossemer this special steel was manufactured at the Atlas Works in huge quantities. Soon afterwards he began to turn his attention to rolling steel plates as armour-plating for war vessels. Up to 1863 he had sheathed with iron armour fully three-fourths of the whole British navy. He was knighted in 1867.

Brown, JOHN (1800-59), American abolitionist, was born in Torrington, Conn., and was a direct descendant of Peter Brown, one of the *Mayflower* pilgrims. Deeply imbued with the religious principles of his forefathers, he early conceived a hatred of slavery. In 1855 he joined his sons, who had settled in Kansas, where he played a prominent part in the savage border warfare with Missouri. In June 1859 he rented a farmhouse about six miles from Harper's Ferry, and organized a plot to free the slaves of Virginia. On October 16 he, with the aid of twenty-two friends, six of whom were negroes, surprised and captured the arsenal at Harper's Ferry, but was wounded, taken prisoner by the Virginia

militia, tried by court-martial, and hanged along with four of his sons at Charleston on December 2. The incident at Harper's Ferry helped largely to hasten the civil war. See *Brown's Life and Letters*, ed. by Webb (1901); *Sanborn's Life and Letters* (1885); *Newton's Captain John Brown of Harper's Ferry* (1902); and *Villard's John Brown, 1800-1859* (1909).

Brown, LANCELOT (1715-83), English architect and landscape gardener, known as 'Capability Brown,' was born at Harle-Kirk, Northumberland. He was the founder of the modern or English style of landscape gardening, and remodelled and laid out the grounds at Kew, Blenheim, and Nuneham Courtenay. After amassing a large fortune he retired to Huntingdon, of which town he became sheriff.

Brown, OLIVER MADOX (1855-74), painter and author, son of Ford Madox Brown, born at Finchley, Middlesex. At the Dudley Gallery he exhibited *Chiron receiving the Infant Jason from the Slave* (1869) and *Obstinacy* (1870), and, at the Royal Academy, *Exercise* (1870). His other pictures include *The Tempest*, *Prospero and the Infant Miranda* (1871), and *A Scene from 'Silas Marner'* (1872). He is the author of *To All Eternity*, a poem (1871); *Gabriel Denver* (1873); *Hebditch's Legacy* and *The Duale Bluth*, posthumous works (1876); and *Literary Remains* (1876). See biographical sketch (1883) by John H. Ingram.

Brown, PETER HUME (1850), professor in the Fraser chair of ancient history and palæography in Edinburgh University since 1901, and Historiographer-Royal for Scotland (since 1908), was born in Haddingtonshire, and became a teacher. At the present day he is one of the leading historians of Scotland. In 1898 he was appointed editor of the

Register of the Privy Council of Scotland, in course of publication. His works include *George Buchanan, Humanist and Reformer* (1890); *Early Travellers in Scotland* (1891); *Scotland before 1700* (1893); *John Knox: a Biography* (1895); *Hist. of Scotland* (1898-1909); and *Scotland in the Reign of Queen Mary* (1904). The article on the History of Scotland in this encyclopædia was written by him.

Brown, ROBERT (1773-1858), Scottish botanist, was born at Montrose. He resigned (1801) his position as assistant surgeon in the army to become naturalist to the expedition sent out by the Admiralty under Flinders to explore the coast of Australia. He returned to Britain in 1805, bringing with him a collection of 4,000 species of plants. He succeeded (1810) Dr. Dryander as librarian to Sir Joseph Banks, and in 1805 was appointed librarian of the Linnean Society. He published the results of his researches in 1810 in *Prodromus Floræ Novæ Hollandiæ*, the first British work on botany which treated of plant arrangement in a philosophical spirit. In 1823 Sir Joseph Banks bequeathed to Brown his library and herbarium. The latter he handed over to the British Museum; whereupon he was appointed, in 1827, keeper of the botanical department of that institution. In the same year he discovered 'Brownian movements' (*q.v.*). In 1839 he was awarded the Copley medal of the Royal Society, and afterwards received a pension of £200 from the civil list. Brown's *Miscellaneous Botanical Works* (2 vols. 1866-8) were edited for the Ray Society by J. J. Bennett.

Brown, THOMAS (1663-1704), satirist, generally styled 'Tom' Brown, author of numerous dialogues and other miscellanies, was a native of Shropshire. As a student he distinguished—and

extinguished—himself at Oxford by his rendering of Martial's epigram, which he applied to the dean of his college, commencing, 'I do not love thee, Dr. Fell.' From Oxford he went to London, where he laid out his powers on small jests and gross buffoonery, levelled principally at the distinguished men of the time. See *Memoir* (by James Drake) prefixed to Brown's *Collected Works* (3 vols. 1707-8), and T. Cibber's *Lives of the Poets*, vol. iii. (1753.)

Brown, THOMAS (1778-1820), Scottish metaphysician, son of the minister of Kirkmabreck, Kirkcudbrightshire. Having studied law and medicine, in 1806 he became partner with the celebrated Dr. Gregory. Dugald Stewart being in a declining state of health, Brown lectured for him for two seasons, and was appointed his colleague in 1810. He died during a visit to London. His *Lectures* (21st ed. 1870) were published shortly after his death, and had great popularity in Britain and the United States. In 1818 (new ed. 1821) he produced an elaborate *Inquiry into the Relation of Cause and Effect*, in defence of Hume. Brown was a disciple of the Scottish school of Reid and Stewart. See D. Welsh's *Account of the Life and Writings of Thomas Brown* (1825), J. M'Cosh's *Scottish Philosophy* (1875), and A. S. Pringle-Pattison's *Scottish Philosophy* (1900).

Brown, THOMAS EDWARD (1830-97), schoolmaster and poet, was born at Douglas, Isle of Man. After taking orders, and serving as vice-principal of King William's College and master of the Crypt School, Gloucester (1858-61), he went to Clifton, where he was master under Dr. Percival from 1864-93. His English poetry is full of thought, feeling, and imagination, but has been little valued in proportion to its deserts, either before or since his

death. His Manx poems, chiefly rollicking narratives in racy dialect, were prompted by a passionate love of his native island, with every corner of which he was familiar, and to which he retired on leaving Clifton in 1893. He died at Clifton while giving an address to the school. Works: *Betsy Lee* (1873); *Fo'c'sle Yarns*, etc. (1881; 2nd ed. 1889); *The Doctor*, etc. (1887); *The Manx Witch*, etc. (1889); *Old John*, etc. (1893); *Collected Poems* (with portrait), edited by W. E. Henley, H. G. Dakyns, H. F. Brown (1900); *Letters*, edited by S. T. Irwin (1900).

Brown, Sir William (1784-1864), Liverpool 'merchant-prince,' was born at Ballymena, Co. Antrim, Ireland. When he was sixteen he went to the United States, where he started his commercial career in the linen trade, at Baltimore. In 1809 he returned to England, and established a branch of the firm at Liverpool, becoming, at the same time, a general merchant, and subsequently a banker. He acquired immense wealth, and a few years before his death gave £40,000 to erect the Public Library and Derby Museum in Liverpool, which was opened in 1860. He represented S. Lancashire in Parliament in 1846, 1847, 1852, 1857, and 1859, when he retired, and was raised to the baronetage in 1863. See Bourne's *English Merchants*, vol. ii. (1886).

Brown Bess, soldiers' name for the regulation bronzed flint-lock musket formerly used in the British army. Said to be an imitation of the name brown bill, which was given to an earlier weapon.

Browne, Charles Farrar (1834-67), better known as ARTEMUS WARD, American humorist, was born at Waterford, Maine. At first a compositor, and then a reporter and contributor to vari-

ous newspapers, he began in 1858 to write in the *Cleveland Plain-dealer*, under the title of 'Artemus Ward, showman,' the actual name of an eccentric old showman whom he knew. His droll contributions, with their mixture of quaint spelling, keen wit, and shrewd common sense, soon came to be widely read. In 1860 he left Cleveland for New York, to edit a new comic paper, *Vanity Fair*, which, however, had only a brief existence. He then gave his first satirical lecture, *The Babes in the Wood*, which was conceived in a unique vein of humour. With this lecture he travelled over the plains and the Rocky Mts., meeting with some adventures among the Indians and the Mormons. In 1866 he came over to England, and opened his show with a panorama in the Egyptian Hall. His lectures excited roars of laughter, his wit being of a new and wholly unconventional type. He became a contributor to *Punch*. He died at Southampton. Many of his sketches were published in volumes, respectively entitled *Artemus Ward, his Book* (1862); *Artemus Ward, his Travels among the Mormons* (1866); and *Artemus Ward in London* (1867). They were subsequently collected into a single volume, entitled *The Complete Works of Artemus Ward* (1875). Browne was a humorist *sui generis*, like Hood and Mark Twain. The delicious inconsequence of Browne's humour, with its clever touches of human nature and its utterly unexpected antitheses, gives it a unique quality.

Browne, Edward Granville (1862), Persian scholar and lecturer, and Sir Thomas Adams's professor of Arabic in Cambridge since 1902, son of Sir Benjamin C. Browne, engineer and ship-builder, Newcastle, was born at Wley, near Dursley. He studied medicine and science, but after

a course of travel in Persia he abandoned the practice of science for the cultivation of Oriental languages, and has published many valuable treatises, notably a Persian text of the history of the Bab, with an English translation and notes (1891), *The New History of Mirza Ali Muhammad the Bab* (1893), *Catalogue of Persian Manuscripts in Cambridge University Library* (1896), a critical edition of Daulatshah's *Tadhkira* (1901), *The Literary History of Persia until the Time of Firdavsi* (1903), *until the Mogul Invasion* (1906), *Abridged Translation of Ibn Isfandiyyâr's History of Tabaristân, Short Account of Recent Events in Persia* (1909), and *The Persian Revolution of 1905-9* (1910). Professor Browne has taken a prominent part in the defence in this country of the Persian nationalist movement.

Browne, EDWARD HAROLD (1811-91), bishop of Ely and of Winchester, was born at Morton House, Bucks. He was a wrangler at Cambridge in 1832, gaining in 1833 the Crosse theological scholarship, in 1834 the first Hebrew scholarship, and in 1835 the Norrisian prize. From 1843 to 1849 he was vice-principal at St. David's College, Lampeter, and in 1857 vicar of Heavitree, Exeter, and canon of Exeter. In 1864 he became bishop of Ely, and in 1873 succeeded Wilberforce as bishop of Winchester. Browne, who published a large number of works on theological subjects, took a great interest in the Old Catholic movement in Germany. His best-known works are, *Exposition of the Thirty-nine Articles* (1850-3), which is a textbook for candidates for Episcopal ordination; *The Messiah* (1862); and *The Pentateuch and Elohistic Psalms* (1863), a reply to Dr. Colenso. See *Life* by Dean Kitchin (1895).

Browne, GEORG, COUNT VON (1698-1792), Russian general, born in Scotland of an old Norman family, but educated at Limerick. Owing to the Catholic Disabilities Acts he left Scotland, and entered first the service of Germany (1725), and afterwards the army of Russia (1730), and soon distinguished himself by suppressing a revolt of the Guards against the Empress Anna. He took part in various campaigns against Poland, France, and the Turks, being made prisoner by the last named in 1739 and sold as a slave. Liberated through the influence of Villeneuve, French ambassador at Constantinople, he returned to Russia, was made a general, and distinguished himself in the Swedish war from 1742. At the beginning of the Seven Years' war he was severely wounded at the battle of Zorn-dorf. He was created a field-marshal by Peter III., and entrusted with the conduct of the war against Denmark. For the last thirty years of his life he was governor of Esthonia and Livonia.

Browne, HABLOT KNIGHT (1815-82), known as 'Phiz,' book-illustrator, caricaturist, and water-colour painter, was born at Lambeth, of French descent. After serving his apprenticeship to a mechanical line engraver, he was chosen by Dickens (1836-7) to illustrate the *Pickwick Papers*, then being published; signing his pictures with the pseudonym 'Phiz,' as an appropriate complement to the author's 'Boz.' With *Pickwick* both artist and author at once achieved fame, and the illustrations of 'Phiz' have become identified with the first editions of Dickens's earlier novels. His well-known style is incisive, masterly, and full of humour, with a strong tendency to exaggeration and caricature. Numerous examples of his work occur in other novels (by Lever and Ainsworth)

and publications of the mid-Victorian era. Struck with paralysis in 1867, he was kept from want by an annuity from the Royal Academy. He died at Brighton. See *Life* by D. C. Thomson (1884).

Browne, MAXIMILIAN ULYSSES, BARON DE CONNUS AND MOUNTANY, COUNT VON (1705-57), Austrian field-marshal, nephew of Georg, Count von Browne; entered the Austrian army early in life, and took part in the wars of the Polish succession (1733-8), in Italy (1734), against the Turks (1737-9), and was appointed commander-in-chief in Sillesia. In 1740, when Frederick the Great of Prussia invaded that province, Browne retired to Moravia, but returned afterwards and took part in the battle of Mollwitz. He fought in the war of the Austrian Succession, and was created a field-marshal in 1749. At the beginning of the Seven Years' war he was in command in Bohemia, and opposed Frederick II. at Kolin (1756), and the Saxons at Pirna (1756), but without success. In 1757 he distinguished himself in the battle near Prague, but was fatally wounded during the ensuing siege.

Browne, ROBERT (?1550-1633), founder of the religious sect of the 'Brownists,' became in 1572 a schoolmaster in London and an outdoor preacher, afterwards gathering at Norwich and elsewhere congregations who held with their leader that the church was not so much a witness of divine truth to enlighten the world, as merely a witness against the world. He was several times arrested and imprisoned, though occasionally and successfully interceded for by his relative Cecil, Lord Burghley; but at last, for refusing to appear before a bishop when cited, he was excommunicated, and had to flee to Holland (1581-4). Unwilling, however, to leave the Church of England,

Browne stopped his agitation; and after acting (1586) as schoolmaster of Stamford, and (1591) as rector of Achurch, he died in Northampton. See Fuller's *Church History* (1655); John Browne's *History of Congregationalism in Norfolk and Suffolk* (1877); Dexter's *Congregationalism of the last Three Hundred Years* (1880), and Burrage's *True History of Robert Browne* (1906).

Browne, THOMAS A. See BOLDFREWOOD, ROSE.

Browne, SIR THOMAS (1605-82), English physician, antiquary, and author of *Religio Medici*, the son of a London merchant; studied in France, Italy, and Holland, receiving the degree of M.D. from the University of Leyden about the year 1633, and that of Oxford in 1637. In the same year he settled in Norwich, and there practised as a physician all his life, living calmly amid the din and discord of the civil war, and maintaining an active correspondence with the antiquaries and scientists of his time. He was knighted by Charles II. in 1671. In 1840 his grave in St. Peter's, Mancroft, at Norwich, was discovered by some workmen, and his skull was placed in the hospital museum of the town. The *Religio Medici* ('Religion of a Physician') was written about 1634 for his own pleasure; but in 1642, an edition having been published without his sanction, he was compelled to publish, in 1643, an authorized edition, which had a great success. It reveals the pious musings of a man of simple faith on the subject of the spiritual life and the mysteries of the unseen. In 1646 appeared his *Pseudodoxia Epidemica, or Enquiries into . . . Vulgar and Common Errors*, though he himself was a believer in alchemy, astrology, and witchcraft. In 1658 he published his *Hydriotaphia, or Urn-burial*, which for richness of dic-

tion can hardly be paralleled by any work in the English language. To this work was appended the *Garden of Cyrus*, a quaint conceit, treating of horticulture from 'Adam's time to that of Cyrus,' and showing that the quincunx, or number five, is found 'in roots of trees, in leaves, and everything.' Several tracts on morals and antiquities, attributed to him, were published (1683; new ed. 1712). See *Collected Works* (4 vols. ed. by Wilkin, 1835-6; ed. by C. Sayle, 1904, etc.), and Gosse's *Sir Thomas Browne* (English Men of Letters Series, 1905).

Browne, WILLIAM (1591?-1643), English pastoral poet, was born at Tavistock. His poetic years were 1613-16, during which he produced *Britannia's Pastorals*, a rural descriptive narrative in his favourite Spenserian vein, and the more formal eclogues of *The Shepherds' Pipe* (1614). To the latter Christopher Brooke, George Wither, and John Davies of Hereford also contributed; while Ben Jonson, Michael Drayton, and Selden were numbered amongst Browne's friends. Browne wrote the epitaph, sometimes ascribed to Ben Jonson, on 'Sidney's sister.' He was tutor at Oxford to Robert, Lord Dormer of Wing. His works were collected and printed in 1772, and are also given in the fifth volume of Chalmers's edition of the poets (1810). They have also been edited (with Memoir) by W. Carew Hazlitt for the Roxburgh Club (1868); and Sir Egerton Rydges printed (1815) a number of his verses which had never been previously published.

Brownhills, vil., Staffordshire, England, on L. & N.W.R. and M.R., 5 m. N.N.E. of Walsall; has extensive coal mines. Pop. 15,000.

Brownian Movements, or MOTIONS, are rapid vibratory motions observed in microscopic particles, both vegetable and min-

eral, when suspended in water, and first noticed by the botanist Robert Brown (q.v.) in 1827. The movements have often been mistaken for vital motions; but they are still apparent when the liquid containing bacteria has been sterilized. Jevons has proved that solid matter of every kind, when finely divided, gives evidence of Brownian movements.

Brownie, a term in Scottish tradition signifying 'little brown one,' and applied to a race chiefly remembered as occupying a servile position in houses and on farms. A typical specimen was the brownie who lived at Strathmiglo in Fifeshire. 'Every day he used to cross the water of Miglo by stepping-stones, and acted as the useful drudge at the Tower of Cash; and all he asked in return was to feed out of any dish he chose.' The chief of the MacLachlans had a brownie who was his personal attendant, and lived in one of the dungeons at Castle Lauchlan. Accounts vary, but the brownies are generally described as a naked people, with hirsute skins. Supernatural powers are also attributed to them. Some think that they were an early non-Aryan race, remembered in a dim and confused way by the peasantry. See GNOME and DWARFS, James Hogg's *Brownie of Bodsbeck*, George MacDonald's *Sir Gibbie*, and John Buchan's *Watcher by the Threshold* (1902).

Browning, ELIZABETH BARRETT (1806-61), was born at Coxhoe, in the county of Durham, on March 6, 1806. Conflicting evidence both as to place and exact date may fairly be considered settled by Mr. Ingram (see below). Her girlhood was spent at Hope End in Herefordshire. From an early age an invalid—largely due to an accident to her spine—her health gave chronic anxiety till she was thirty-four, when her nervous weakness was increased by

the death of her only brother by drowning at Torquay. Four years later, however, she was (against her father's wish) married, in London, to Robert Browning, Sept. 12, 1846; and after the birth of their son, in Florence, early in 1849, she gained a fresh lease of life. For many years the Brownings lived in Florence, with intervals of residence in London and Paris, and latterly at Rome; and it was in her loved Florence, the city of her *Casa Guidi*, that, on June 29, 1861, she died.

Probably the most popular work of Elizabeth Barrett Browning was *Aurora Leigh*. It is possible, of course, that this famous 'novel in verse' found in its day a wider circle of readers; it is incredible, however, that the inner circle which loves poetry for its own beauty should rank that diffuse if beautiful work, or any other of the author's longer writings, with the matchless *Sonnets from the Portuguese*, the most personal expression, in English or any other literature, of a woman's love for a man. Already *Aurora Leigh* is among the masterpieces that are seldom read. In all the mass of Elizabeth Barrett Browning's poetry—none of it worthless, little of it uninteresting, most of it delightful—these *Sonnets*, together with one or two poems and lyrics, like the *Dead Pan* (1844) and *The Cry of the Children* (1844), are the enduring and classic part.

Works.—*An Essay on Mind* (anonymous), and the privately-printed poem *The Battle of Marathon* (1826); *Prometheus Bound*, etc. (1833); *The Seraphim* (1838); *A Drama of Exile*, and *Sonnets from the Portuguese*, etc., collected in *Poems* (2 vols. 1844; reprinted at New York as *A Drama of Exile*, etc., 1845); *The Runaway Slave at Pilgrim's Point* (1849); *Casa Guidi Windows* (1851); *Two Poems by E. Barrett and E. Brown-*

ing (1854); *Aurora Leigh* (1856-57); *Poems before Congress* (1860). Posthumous.—*Last Poems* (1862); *The Greek Christian Poets and the English Poets* (1863); *Selected Poems*, edited by Robert Browning (2nd ser. 1866, 1880); *Letters to R. H. Horne* (2 vols. 1876-7); *Earlier Poems* (1826-33, 1878). *Collected Works*.—2 vols., New York, 1871; 5 vols., London, 1890. See also Kenyon's *Poems of E. B. Browning* (1897), and *Letters of E. B. Browning* (1897). Life.—The most accessible monograph is that by J. H. Ingram, in the 'Eminent Women Series' (1888). See also Merlette's *La Vie et l'Œuvre de E. B. Browning* (1906), T. H. Ward's *English Poets* (1883), Miles's *English Poets* (1899), and *Dict. Nat. Biog.*

Browning, OSCAR (1837), university lecturer in history, and principal of Cambridge University Day Training College (1891-1909). He graduated as fourth in the classical tripos (1860). From 1860 to 1875 he was an assistant master at Eton. He is a leading exponent of the training of teachers. As a Liberal he contested unsuccessfully Norwood (1886), E. Worcestershire (1892), and W. Derby (1895). Chief works: *Modern England* (1878), *Modern France* (1880), *Hist. of England* (4 vols. 1890), *The Citizen: his Rights and Responsibilities* (1893), *Charles XII. of Sweden* (1899), *Wars of the Century* (1903), *Hist. of Europe 1814-43* (1901), *Impressions of Indian Travel* (1903), *Napoleon: First Phase* (1905), *The Fall of Napoleon* (1907), and *Memories of Sixty Years* (1910).

Browning, ROBERT (1812-89), one of the two greatest poets of the long and brilliant Victorian era, was born at Camberwell, then an outlying suburb of London, May 7, 1812. Browning had a happy childhood in

a prosperous and well-ordered household, and enjoyed the careful training of affectionate and cultured parents. From boyhood he showed exceptional intellectual and literary tendencies, and when he was no more than twelve years old his father printed for him his poetic 'first-fruits,' under the title *Incondita*. He never went to a public school, nor to one of the great universities; though, when his education by a private tutor was finished, he attended, during the session of 1829-30, a course of lectures at University College, London. The most important educational event in the youth of Browning was his sojourn, in his twenty-second year (1833-4), in Russia and Italy. His first publicly-printed poems appeared (above the signature 'L.') in the *Monthly Repository* (1834). His earliest dramatic effort, *Strafford*, was produced by Macready at Covent Garden (May 1, 1837). From this date (by which time *Pauline* and *Paracelsus* had been published) Browning determinedly devoted himself to the art of poetry; and it is significant that the three greatest modern English poets—Wordsworth, Tennyson, and Browning—each consciously and scrupulously ordered life and circumstance to the one great end, never swerving, never despairing, never expending energy in any other direction. But the attention of the reading world was not easily won; and the poet's first important book—*Sordello* (1840)—did not cause any considerable flutter in the literary dovecotes of the day. Ordinary readers, blamed for obtuseness by enthusiasts, may take consolation in the circumstance that Tennyson himself, friend and admirer though he was, 'could make nothing of it.' 'There are,' he declared in effect, 'only two lines in *Sordello* that I can understand—the first and the last—and

neither is true!' (i.e. 'Who will, may hear *Sordello's* story told; and 'Who would, has heard *Sordello's* story told'). And Carlyle, it will be remembered, said that his wife had read *Sordello* through 'without being able to make out whether *Sordello* was a man, or a city, or a book.' On Sept. 12, 1846, after the issue of that marvellous series of dramatic and lyrical poems, in eight parts, published at regular intervals between 1841 and 1846, collectively grouped under the title *Bells and Pomegranates*, Browning married Elizabeth Barrett (see BROWNING, E. B.), already a poet far more widely known to the public than himself. 'This happy marriage belongs to the realm of poetry itself. A beautiful and dignified love sustained them during all their wedded years; and a son was born to them in March 1849, in Florence, where the Brownings had settled in the winter of 1847, and which, with several intervals, remained their 'home city' till the summer of 1861, when Mrs. Browning died. From the autumn of 1861 Browning resided in London (in Warwick Crescent, Paddington, till 1887, and then in De Vere Gardens, South Kensington), though with frequent and often prolonged visits to Italy. In November of 1889 he joined his son at the Palazzo Rezzonico (which he had purchased) in Venice, and, after a brief and painless illness, died there on December 12. On the last day of 1889 his body was laid in the 'Poets' Corner, Westminster Abbey.

The greatness of Robert Browning as a poet is beyond dispute. The spiritual secret of his mastery is revealed in his words spoken of Shelley: 'I prefer to look for the highest, not simply the high.' Great as has been his moulding influence on the character and mind of a vast

number of readers—to whom perhaps, in the main, the ethic of his poetry was of chief import—he has also enriched our literature with verse of enduring poetic beauty. At his highest reach he gave to English poetry, and particularly that which in form is at once dramatic and lyrical, a new field and a new outlook. In a hundred masterpieces—from *Pippa Passes* to the *Asolando* of his old age; from the superb verse of *Paracelsus* to the last ‘flute-note with an accompaniment’—we may discern the master-mind of one who, beyond all cavil, is a great poet. Time and change will alone settle the question of ‘the great thinker.’ His spiritual message, as distinct from his poetic achievement, can be summed up in one line (in the prologue to *Pacchiarotti*): ‘Hope hard in the subtle thing that’s spirit.’

Works.—*Incondita* (privately printed, 1824); *Pauline* (1833); *Paracelsus* (1835); *Strafford* (1837); *Sordello* (1840); *Bells and Pomegranates* (1841–6), in eight parts—viz. ‘*Pippa Passes*’ (1841), ‘*King Victor and King Charles*’ (1842), ‘*Dramatic Lyrics*’ (1842), ‘*The Return of the Druses*’ (1843), ‘*A Blot in the ‘Scutcheon*’ (1843), ‘*Colombe’s Birthday*’ (1844), ‘*Dramatic Romances and Lyrics*’ (1845), ‘*Luria*, and ‘*A Soul’s Tragedy*’ (1846); *Christmas Eve and Easter Day* (1850); *Two Poems by E. Barrett and R. Browning* (1854); *Men and Women* (2 vols. 1855); *Dramatis Personæ* (1864); *The Ring and the Book* (4 vols. 1868–69); *Balaustion’s Adventure* (1871); *Prince Hohenstiel-Schwangau* (1871); *Fifine at the Fair* (1872); *Red Cotton Night-cap Country* (1873); *Aristophanes’ Apology* (1875); *The Inn Album* (1875); *Pacchiarotti* (1876); *La Saisiaz* and *The Two Poets of Croisic* (1878); *Dramatic Idylls* (2 ser. 1879–80); *Jocoseria* (1883); *Fer-*

ishtah’s Fancies (1884); *Parleyings with Certain People* (1887); *Asolando* (1889–90). Collected Works.—The first ‘collected edition’ was published (*Collected Poems*) in 2 vols., in 1849; the next in 3 vols., in 1863; the third in 6 vols., in 1868; and the fourth in 16 vols., in 1888–9. Lately several cheap editions of the poetical works fallen out of copyright have appeared, as in the ‘*Canterbury Poets Series*’ (Walter Scott). An edition of *The Ring and the Book* is published in ‘*Nelson’s Shilling Library*.’

Besides these original writings, Browning published a translation of the *Agamemnon* of Æschylus (1877). He edited, also, *Selections from Mrs. Browning’s Poems* (1866 and 1880), *Mrs. Browning’s Poetical Works* (1889–90), and (in 1884) a book called *The Divine Order*, by the Rev. T. Jones.

Biographical and Bibliographical.—*Life of Robert Browning*, by William Sharp (‘*Great Writers Series*,’ 1890), with a bibliography; *Life and Letters*, by Mrs. Sutherland Orr (1891; new ed. 1908); *Robert Browning*, by Edmund Gosse (1890); *Life*, by W. H. Griffin and H. C. Minchin (1910); and many other critical and expository volumes, British and American, among which should be mentioned *The Browning Society Papers* (1881–90); and G. K. Chesterton’s monograph in ‘*English Men of Letters Series*’ (1903; new ed. 1908).

Browning Settlement, York Street, Walworth Road, London, S.E. It includes a hall, men’s home, tavern, club, Dale library of Christian sociology, homes for old folks at Whyteleafe, Surrey, and a holiday home at Horsham, Sussex. Its aim is to ameliorate the conditions of life in Southwark.

Browning Society, THE. Founded in 1881 for the study

and discussion of Browning's works. It was dissolved in 1893, after having issued some valuable papers.

Brownists. See BROWNE, ROBERT.

Brown - Séquard, CHARLES EDWARD (1817-94), physician and physiologist, was born in Mauritius, his father being a native of Philadelphia, and his mother French. He graduated M.D. at Paris in 1846, and devoted himself to physiological investigations, making numerous discoveries in the composition of the blood, animal heat, the spinal column and its maladies, the muscular system, and especially the nervous system. After acting (1859-63) as physician to the Hospital for the Paralyzed and Epileptic in London, he became professor of physiology and pathology at Harvard in 1863, but returned to Paris in 1868, and became professor of pathology (1869-72) in the Faculty of Medicine. In 1872 he settled in New York as a medical practitioner, treating especially diseases of the nervous system; but in 1875 he was once more in Paris, where he succeeded Claude Bernard (1878) in the chair of experimental medicine at the Collège de France. He published lectures on *Physiology and Pathology of the Nervous System* (1866), *Paralysis of the Lower Extremities* (1866), and *Nervous Affections* (1873).

Brownson, ORESTES AUGUSTUS (1803-76), American author, born in Windsor county, Vermont. He was successively a Presbyterian, a Universalist, a Deist, and finally (1844) a Roman Catholic. He founded (1838) the *Boston Quarterly Review*, afterwards *Brownson's Quarterly Review* (1844-64), and most of his writings appeared in these periodicals. His works include *Charles Elwood, or the Infidel Converted* (1840), an account of his religious experiences;

The Spirit-rapper: an Autobiography (1854); *The Convert, or Leaves from my Experience* (1857); *The American Republic: its Constitution, Tendencies, and Destiny* (1865). His collected works were published (1882-3), and a *Life* (1898-1900) by his son. — HENRY FRANCIS (1835), son of above, born at Canton, Mass. He translated Balme's *Fundamental Philosophy* (1856), Tarducci's *Life of Columbus* (1891), *Life of John and Sebastian Cabot* (1893), and published *Faith and Science* (1895), *Equality and Democracy* (1897), and *Life of Orestes A. Brownson* (1898-1900).

Brown Spar, in mineralogy, is a term applied to a magnesian carbonate of lime, tinged by oxide of iron and manganese. It is also called *pearl spar*. See DOLOMITE, of which it is a variety.

Brownsville, city, Texas, U.S.A., co. seat of Cameron co., situated in the s. part of the state, on the Rio Grande, opposite Matamoros, Mexico, and 20 m. from the Gulf Coast. It has an important river traffic and extensive trade with Mexico. There is a Roman Catholic cathedral. Near Brownsville took place the last engagement between North and South in the civil war. Pop. 10,500.

Broxburn, mining tn., Linlithgowshire, Scotland, 12 m. w. of Edinburgh; coal mines, shale pits, paraffin works, brickfields, and chemical manure works. Pop. 8,000.

Brozzi, tn., Italy, 5 m. w. of Florence; manufactures straw hats. Pop. (comm.) 11,000.

Bruay. (1.) Mining vil., dep. Pas-de-Calais, France, 6 m. s.w. of Béthune. There are breweries in the place, and gas coal is mined in the neighbourhood. Pop. 16,500. (2.) Vil., dep. Nord, France, 3 m. N. by E. of Valenciennes. Pop. (comm.) 7,500.

Bruce. See ELGIN, EARLS OF.

Bruce, JAMES (1730-94), African traveller, was born in Stirling-shire, Scotland. Proceeding to London, he (1754) became partner in a wine merchant's business; but giving this up in 1761, he became consul-general at Algiers in 1762. In 1768 he set out from Cairo on his famous journey to Abyssinia. After sailing up the Nile as far as Syene, he crossed the desert, and reached Jeddah in April 1769. From thence he penetrated to Gondar, the capital of Abyssinia, and in November 1770 he found the sources of the Bahr-el-Azrek, or Blue Nile, which was considered the main stream of the Nile. Bruce remained in Abyssinia about two years, and then made his way back to Alexandria, whence he proceeded, in March 1773, to France, where he spent some time in the society of Buffon and other distinguished savants. Returning to Scotland, he prepared for publication his *Travels to discover the Sources of the Nile*, which appeared in 1790 in five large quarto volumes. The strange details which Bruce gave about the Abyssinians and the Gallas led many to be sceptical regarding their truth, and among the doubters was Dr. Samuel Johnson. The author's general accuracy, however, has been verified by later travellers. See Murray's *Life of James Bruce* (1808).

Bruce, JOHN (1802-69), English antiquarian and lawyer, born in London. He was brought up to the law, but this he abandoned (1840) to take up historical and antiquarian research. He edited the *Calendar of State Papers, Domestic Series, 1625-39* (1858-71), and wrote numerous historical tracts.

Bruce, JOHN COLLINGWOOD (1805-92), English antiquary, was born at Newcastle; chose the profession of teaching, and succeeded (1834) to his father's school. This he relinquished in 1863, and de-

voted himself entirely to the study of Hadrian's Wall, and the work of the Newcastle Society of Antiquaries. His well-known books are, *Incised Markings on Stone* (1869), *Description of the Roman Wall* (1851), and *Handbook to the Roman Wall* (6th ed. 1909).

Bruce, MICHAEL (1746-67), Scottish poet, born at Kinnesswood, Kinross-shire; became schoolmaster at Gairney Bridge, near Loch Leven, and at Forrest Mill, Clackmannanshire. His reputation rests mainly on the *Ode to the Cuckoo*, and on certain versified renderings of Scriptural passages included in the Scottish Paraphrases; but his claim to both has been disputed by David Laing and J. Small, in favour of that of John Logan, minister of South Leith, a college friend, who edited his *Poems on Several Occasions* (1770). The question has given rise to a long and heated controversy, but the balance of authority is in favour of Bruce. See the *Lives* by Mac-Kelvie (1837), Grosart (1865), Stephen; (1895), and Mackenzie (1905).

Bruce, ROBERT (1274-1329), king of Scotland, belonged to the Norman family De Bruis, which, in the person of Robert de Bruis, came to England with the Conqueror in 1066. This knight received large grants of land, chiefly in Yorkshire; and his son Robert, who was an associate of the prince who afterwards became David I. of Scotland, obtained the lordship of Annandale. The family thus held lands in both kingdoms, and this fact is the explanation of the somewhat tortuous policy pursued by them, as well as by others of the Norman barons whom David introduced into Scotland. At the battle of the Standard (1138), Robert Bruce, who had received the original grant of Annandale, fought on the English side; while his son, the third Robert, fought

under David, and was taken prisoner, it is said, by his own father. The fifth lord of Annandale, Robert de Bruis (1210-95), was a competitor with John Baliol for the crown of Scotland in 1290, claiming the honour as a son of the second daughter of David I. But in 1292 Edward I. awarded the crown to Baliol; and Bruce, to avoid recognition of his rival's claims, resigned to his son, Robert de Bruis (d. 1304), his Scottish lordship of Annandale. This sixth lord in turn did fealty to Edward I., and fought on the English side when Baliol was forced to throw off the English yoke. He claimed the throne which Baliol relinquished; but Edward refused, and the claims of the house of Bruce were inherited by his son, the greatest of the family, ROBERT BRUCE, who at first followed the family policy. In 1296 he swore allegiance to Edward I.; but he 'changed sides so often that it is difficult to follow his devious career.' In any case, the year 1306, which saw him finally break with Edward I., was the beginning of the salvation of Scotland. What the circumstances were which led him at Dumfries to murder Comyn, a nephew of Baliol, and a rival for the Scottish crown, are not clearly known; but the event meant at once a complete break with Edward I., who had favoured Comyn, and the hostility of half of Scotland which held by Comyn. But from 1306 Bruce faced the difficulties of his situation, and gradually won, by his ability and his success, the esteem and confidence of the people of Scotland, who had known many years of Edward's 'resolute' government. At first fortune was against him. He had himself crowned at Scone, where the poverty of his support was painfully apparent. Within a few months he was surprised at Methven, and defeated in the

Highlands by the Lord of Lorn, an uncle of the murdered Comyn, and was forced to withdraw from Scotland and winter in the island of Rathlin, off the north coast of Ireland; while, to complete his misfortunes, his wife and his daughter Marjory were captured by the English, and his brother Nigel and many of his supporters were executed as traitors.

In 1307 the tide turned. Bruce landed at Turnberry, in Ayrshire, defeated the Earl of Pembroke at Loudon Hill, and made good his footing in Scotland again. In the same year the great Edward I. died at Burgh-on-Sands, and was succeeded by Edward II., who was not qualified to carry on the war against such a military leader as Bruce now proved himself to be. District after district owned Bruce's authority; castle after castle fell into his hands. English armies of invasion were checked by his policy of devastating the country before them; and the Scots soon gained strength and confidence enough to make counter-raids into England. In 1310 the Scottish clergy declared Bruce their lawful king, and thus the ban of excommunication which rested on him was practically removed. In 1313 Stirling Castle alone resisted his authority. This stronghold was sorely pressed by Bruce's brother Edward, who was induced rashly to accept a promise of its peaceful surrender if it was not relieved by the English before June 24, 1314. This meant a pitched battle between the two nations, on a site prescribed by the necessity of keeping the English out of Stirling; but whatever the anxieties of the king at this hazard, the result was the disastrous defeat of the English at Bannockburn. From 1314 Scotland was free, and Bruce devoted himself to securing the formal recognition of the sovereignty he had won. He had to deal not only

with obstinacy on the part of England, but with the influence of the Pope, who favoured the English; but eventually he achieved his purpose, and by the treaty of Northampton (1328) the independence of Scotland was acknowledged. The ultimate success of Scotland resulted from his policy of carrying on offensive war against England in the northern counties and in Ireland. The king's brother Edward, for whom, after Bannockburn, there was not room enough in Scotland, sought a legitimate opening against the English in Ireland, where he broke their power, but was himself killed at Dundalk in 1318.

Robert Bruce was as wise a king in peace as he was brave and skilful in war, and his policy was directed to the restoration of Scottish prosperity, and to the safeguarding of the land against English aggression. He encouraged the burghs, and first gave them a place in the Scottish Estates (Cambuskenneth, 1326); and he had the power to carry out, as well as the wisdom to devise. His career may be summed up in the words of Professor Hume Brown: 'At the beginning of his great enterprise the probability is that he was prompted solely by the desire of making good the claims of his own house. But as his work grew and prospered, he rose to the conception of a true patriot king.' He died at Cardross in 1329, and was succeeded by his infant son David II. By his will his heart was to be buried in Jerusalem. It was entrusted to Sir James Douglas to carry thither; but Douglas was killed fighting against the Moors in Spain. Bruce's heart was saved, and being brought back to Scotland, was buried in Melrose Abbey. His body was buried in Dunfermline Abbey. See *Lives* by Sir Herbert Maxwell (1899) and Murison (1899).

Bruce, WILLIAM SPEIRS (1867), Antarctic explorer, born at Edinburgh, and educated at the university of that city. He distinguished himself as a geographer and naturalist. Among early appointments held by him were those of director of the Scottish Oceanographical Laboratory, assistant in *Challenger* Expedition Commission, and superintendent of Ben Nevis Observatory, 1895-6. But his most notable work has been done as an explorer. He has accompanied no fewer than five expeditions to the Polar regions. He acted as naturalist to the Scottish Antarctic Expedition, 1892-3; Mr. Andrew Coats's Expedition to Novaya Zemlya, Wiche Islands, and Barents Sea, 1898; and the Prince of Monaco's Expedition, Spitzbergen and North Polar regions, 1898, 1899, and 1906. He also accompanied the Jackson-Harmsworth Polar Expedition, 1896-7, as zoologist. He is best known, however, as the leader of the Scottish National Antarctic Expedition on board s.y. *Scotia*, 1902-4, the scientific results of which were of great value. Dr. Bruce has also explored and surveyed Prince Charles Foreland and Spitzbergen, 1906-9.

Brucea, a genus of Simarubaceae, named in honour of the Abyssinian traveller. It consists of shrubs with compound leaves, flowers in heads, parts of the flower in fours, and stamens attached to a stalk supporting the four drupes. The stamens are sterile in the female flowers. The species are natives of Abyssinia, China, etc., and some of them possess properties similar to quassia, a drug furnished by a tree of the same natural order.

Bruch, MAX (1838), German violinist, composer, and conductor, was born at Cologne. In 1865 he became director of the Musical Institution at Koblenz. From

1871 to 1873 he lived in Berlin, and afterwards at Bonn, devoting himself almost exclusively to composition. In 1878 he twice visited England, and in 1880 he succeeded Benedict as conductor of the Liverpool Philharmonic; but in 1882 he returned to Breslau, and in 1889 to Berlin. His popularity rests upon his compositions for choir and orchestra, of which nearly a dozen have enjoyed great favour, as *Szenen aus der Frithjofsaga*, *Schön Ellen*, *Odyssey*, *Arminius*, *Lied von der Flocke*, *Römischer Triumphzug*, *Wessobrunner Gebet*, *Nornennenzug*, *Salamis*, *Thermopylä*; though he has also written two operas—*Lorelei* (1863) and *Hermione* (1872)—music for Schiller's *Jungfrau von Orleans*, and many religious and secular pieces, including violin concertos and symphonies.

Bruchsal, tn. and important railway junction, grand-duchy of Baden, Germany, 21 m. s. of Heidelberg. It was formerly the residence of the archbishops of Spiros, whose palace still remains. There is a large convict prison. Pop. 15,000.

Brucine, or DIMETHOXY-STRYCHNINE ($C_{23}H_{26}N_2O_4$), is an alkaloid present in *nux vomica* and St. Ignatius's bean. It is a colourless crystalline solid, with a very bitter taste and similar properties to strychnine; but it is less poisonous, and gives a red colour with nitric acid. See STRYCHNINE.

Bruck. (1.) B. AN DER LEITHA (anc. *Mutenum* and *Leythæ Poths*), tn., prov. Lower Austria, Austria, 26 m. s.e. of Vienna, with a seat of Count Harrach, and in the vicinity a large permanent military camp. Pop. 5,600. (2.) B. AN DER MUR, tn., Styria, Austria, 33 m. n.n.w. of Graz. Iron industries are carried on. Pop. 8,000.

Brückenau, spa, dist. Lower Franconia, Bavaria, 35 m. N. of Würzburg, with carbonic acid

waters which attract 1,500 visitors annually. Pop. 1,600.

Brucker, JOHANN JAKOB (1696–1770), German historian of philosophy, born at Augsburg; became a minister of the Reformed Church, but soon abandoned preaching for literature. His most important work is *Historia Critica Philosophiæ* (1742–44; new ed. 1766–7), a work of immense labour and high reputation; a portion of it was translated into English by W. Enfield (1791). In addition to this he wrote various other learned works, such as *Pinacotheca Scriptorum nostra Ætate Literis Illustrum* (1741–55), etc.

Brückner, ALEXANDER (1834–96), Russian historian of German descent, born in St. Petersburg; was professor of history at the law school in St. Petersburg from 1861–7, and in 1872 was appointed professor of Russian history at the University of Dorpat, but lost the appointment when the university was Russianized in 1891. Among his works are *History of the Russo-Swedish War from 1788–90* (1869, in Russian); *Kulturhistorische Studien: die Russen im Ausland; die Ausländer in Russland im 17. Jahrhundert* (1878); *Beiträge zur Kulturgeschichte Russlands im 17. Jahrhundert* (1887); *Die Europäisierung Russlands* (1888). He has also contributed the monographs *Peter der Grosse* (1879) and *Katharina II.* (1883) to Oncken's collection *Weltgeschichte in Einzeldarstellungen*.

Brückner, ANTON (1824–96), Austrian organist and musical composer, was born at Ansfelden, Upper Austria. In 1868 he was appointed organist of the imperial chapel at Vienna; professor at the conservatorium, and in 1875 lecturer on music at the university. Of his compositions, the best are his religious works—e.g. two masses, a *Te Deum*, etc.

He has also written nine symphonies showing an ultra-Wagnerian tendency.

Brudenell, JAMES THOMAS. See CARDIGAN, EARL OF.

Brueghel. See BREUGHEL.

Brueys, DAVID AUGUSTIN DE (1640-1723), French dramatist and theologian, was born at Aix. Educated in the religious principles of the Calvinists, he engaged in controversy on their behalf; but being converted by Bossuet, he entered the Roman Catholic Church, and wrote religious pamphlets from the new standpoint. He is best remembered by his plays, some of them written in collaboration with Jean Palaprat (1650-1721), the chief being *Le Concert Ridicule* (1689), *Le Grondeur* (1691), *Le Muet* (1691). De Brueys's original works are *Gabinie* (1699) and two or three other plays (some never performed), including *L'Avocat Patelin* (1706). His dramatic works were published in two volumes in 1712.

Bruges (Flem. *Brügge*), tn. and episc. see of Belgium, chief tn. of W. Flanders, 63 m. N.W. of Brussels and 8 m. inland from the North Sea, with which it is connected by two canals leading to Ostend and Sluis respectively, and by a third and much larger (230 ft. wide and 26½ ft. deep) ship canal, constructed at a cost of over 1½ millions sterling, and officially opened in July 1907. Zeebrügge is the sea terminus. From the 12th to the 16th century Bruges was the largest commercial city in the north of Europe, a centre for the English and Scandinavian trade, as well as the emporium of Hanseatic, Venetian, and other Italian merchants, and had at the height of its prosperity a population of 200,000. At the present time it is a quiet, quaint mediæval place, traversed by canals, with small houses turning their gable ends towards the streets,

and a great number of charitable and religious asylums, hospices, refuges, etc. The present cathedral (St. Salvator)—the old cathedral was destroyed by the French in 1799—is of all periods between the 12th and the 19th century. The church of Our Lady, also dating from the 12th century, contains the fine tombs of Charles the Bold, Duke of Burgundy, and his daughter Maria, wife of the Emperor Maximilian. Both churches, and also the church of St. James (13th to 19th century), are adorned with notable Flemish pictures; but the most valuable works of this description in Bruges are the small collection of Moinling's pictures in the hospital of St. John. Amongst other public buildings are the Gothic town hall (14th century); the town chancery (16th century); the famous belfry of Bruges (353 ft. high), built between the 13th and the 15th century, but equipped with its present carillon only in 1743; the museum and picture gallery, with valuable Flemish pictures; the museum of antiquities in the Gruuthuis, a 15th-century structure; the 14th-century (Poorters Loge) archives, the municipal library, a former palace of the dukes of Burgundy, the law courts (with a magnificent 16th-century fireplace), the chapel and museum of the Sacred Blood (12th century), and the Beguinage (13th century). In the lower part of the belfry is a.1. archaeological museum. Pop. 55,000. The foundation of Bruges goes back to before the 7th century. Its citizens played a prominent part in the bloody 'Flemish Vespers,' and the succeeding defeat of the French at Courtrai (1302). In the 15th century the sanding up of the seaway to and at Sluis, the growth of Antwerp, and the shifting of the centres of European commerce brought about by the

discovery of America and the sea route to India, tended (with certain political causes) to weaken and destroy the commercial supremacy of Bruges. The independent yet turbulent spirit of its people was shown in 1488, when they kept prisoner for some months the Roman king (afterwards emperor) Maximilian, and forced him to abdicate the government of Flanders. Its chief manufacture is lace. See W. C. Robinson's *Bruges* (1900), and Omond and Forcstiers *Bruges and W. Flanders* (1906).

Brugg, a very quaint little mediæval tn. in the Swiss canton of Aargau, 19 m. N.W. of Zürich; commands 'the bridge' over the Aar, just above its junction successively with the Reuss (from Lucerne) and the Limmat (from Zürich). Pop. 2,400.

Brugger, FRIEDRICH (1815-70), German sculptor, born at Munich. In 1843 Ludwig I. of Bavaria commissioned him to execute marble busts for the Pantheon or Hall of Fame, and several bronze statues, such as *Gluck* (1848) and *Prince Max Emanuel* for Munich, *Field-marshal Wrede* for Heidelberg, *H. L. Fugger* (1857) for Augsburg, etc. But Brugger shows to greater advantage in mythological subjects, as *Penelope Looing for her Husband*, *Icarus and Dædalus*, and *Edipus in Exile with Antigone*.

Brugsch, HEINRICH KARL (1827-94), German Egyptologist, was born at Berlin. He was sent by the Prussian government to Egypt in 1853, where he joined Mariette in the Memphis excavations. Appointed assistant curator of Berlin Egyptological Museum (1855), he visited Persia in 1860, and acted as German consul at Cairo (1864-8), returning to the chair of Oriental languages at Göttingen. In 1870 he became head of the Khedive's school of Egyptology at Cairo.

On economical grounds he was dismissed from his post in 1879, and afterwards resided principally in Germany, making a visit to Persia in 1884 as member of a German embassy, and again visiting Egypt on behalf of the Prussian government. He died at Charlottenburg. Of his numerous works on Egyptology (over thirty), the most important are *Geschichte Aegyptens unter den Pharaonen* (1877; trans. 1880); *Dictionnaire Géographique de l'Ancienne Egypte* (1877-80); *Thesaurus Inscriptionum Aegyptiacarum* (1882-91); *Religion u. Mythologie der alten Aegypter* (1884-8). See his *Mein Leben und mein Wandern* (1894).

Brühl, vil., Rhineland, Prussia, 10 m. S.S.W. of Cologne, with lignite mines and a royal castle (1725-8). Pop. 7,500.

Brühl, HEINRICH, COUNT VON (1700-64), minister of Augustus III., elector of Saxony and king of Poland, whose position on the throne was established (1733) mainly by Brühl's assistance. From that date to 1746 he gradually got into his own hands the principal offices of state, and from 1746 ruled Saxony in his master's name. He brought the country to the verge of ruin, involving it in a war (1756-63) with Frederick II. of Prussia, who took his capital. After the death of the Elector Augustus, his favourite, dismissed by his successor, survived his master only three weeks. Brühl amassed great wealth, and his collection of 62,000 volumes forms part of the royal library at Dresden. See biographies, *Leben des Grafen von Brühl*, by Justi (1760-1), and *Zuverlässige Lebensbeschreibung d. Grafen von Brühl* (1766).

Bruises are the result of laceration of subcutaneous tissues, the skin itself being unbroken. They commonly result from direct violence, such as a blow with a blunt

weapon, a crush, or a pinch, but are also produced by sudden, violent muscular efforts. The softer the flesh the more easily it is bruised, and fatty tissues bruise easily; some diseases, such as anæmia, scurvy, and hæmophilia, predispose to it. In a bruise the discoloration is caused by hæmorrhage from capillaries and other small blood-vessels, the changes in colour arising from the different stages of blood disintegration and absorption.

Medico-legal investigations frequently involve the question of bruising before and after death. A bruise visible on the surface, and produced before death, would be accompanied by more or less swelling; and on incision coagulated blood would be found, with discoloration of the skin proper. A body bruised after death shows no swelling; and on cutting into the bruise little coagulated blood is found, and the skin is not blackened. It must also be remembered that in the case of a deep-seated injury, received shortly before death, there might be no external sign; though, on cutting down, the hæmorrhage of a severe bruise might be found. A bruise may be distinguished from the post-mortem stain, due to hypostasis, by incision, when the bruise will show coagulated blood, and the post-mortem stain only a few bloody points. The position of the discoloration will also help a decision; for hypostasis is produced by gravitation, and occurs at those points upon which the weight of the dead body has been for some time pressing.

Treatment.—If firm elastic pressure can be applied immediately after the injury and maintained for twenty-four hours, the discoloration will be comparatively slight. The popular remedy of a piece of beef-steak applied to a bruised eye owes its virtue to the elasticity

with which the raw meat can be fitted accurately into the orbit, and presses equally on the loose tissues of the eyelids, where otherwise blood would find its way. A cold compress, say of lead lotion, is also useful, as helping toward coagulation and the stoppage of further subcutaneous hæmorrhage. Later, or if the bruise is already fully developed, frequent gentle massage over the part will greatly hasten the removal of the coagulated blood, and consequently of the disfigurement. Free movement of the part will also help, once the bruise has developed; but perfect rest is necessary if pressure has been applied with the view of preventing discoloration. In very severe cases of bruising, amounting practically to crushing, the flesh is sometimes so severely damaged as to be the seat of gangrene. See GANGRENE.

Brülov, or **BRYLOV**, **CONSTANTIN PAVLOVICH** (1799–1852), Russian painter, born at St. Petersburg; spent six years in Italy, where he made copies from Raphael for the imperial house, especially good being the reproduction of the *School of Athens* (now in the St. Petersburg Academy). Between 1830 and 1833 he executed one of his greatest works, *The Destruction of Pompeii* (now in the Hermitage, St. Petersburg), and in 1834 the *Death of Inez de Castro* (now in the St. Petersburg Academy). On his return to Russia he was appointed (1836) professor at the St. Petersburg Academy. To this period belongs the great canvas *The Siege of Pskov* (now in the St. Petersburg Academy); but he confined his activity chiefly to portraiture and sacred painting, the most notable results being an *Assumption* (in the cathedral of St. Petersburg) and *The Apostles* and other frescoes (in the church of St. Isaac at St. Peters-

burg). See Muther's *Hist. of Modern Painting* (1895-6).

Brumaire, the second month of the year in the French republican calendar; extended from October 22 to November 20 in the years I.-III. and V.-VIII. The 18th Brumaire of the eighth year of the republic (Nov. 9, 1799) is the date on which Napoleon overthrew the Directory and became first consul.

Brumath, or BRUMPT, tn., Elsass, Germany. 10 in. N. by W. of Strassburg. Pop. 5,600.

Brummen, vil., Gelderland prov., Netherlands, 4 m. S.W. of Zutphen; a residential locality. Pop. (comm.) 7,500.

Brummell, GEORGE BRYAN (1778-1840), or BEAU BRUMMELL, English leader of fashion, was a friend of George IV. when prince regent. Owing to his gambling losses he fled (1816) to Calais, where he renewed his old course of life, and in Caen was cast into prison for debt; but being released, he was appointed consul (1830-2) at Caen, where he died in a lunatic asylum. Brummell is remembered for his readiness in repartee and for his fastidious neatness in dress, in which, however, he was not extravagant and foppish, but studiously moderate. See Jesse's *Life of G. Brummell* (1844; new ed. 1886), Fitzgerald's *Life of George IV.* (1881), Bulwer's *Pelham* (1880), Lister's *Granby* (1826), and Boutat de Monval's *Beau Brummell* (1908).

Brun, RUDOLF (c. 1285-1360), first burgomaster of Zürich, Switzerland—an office created in 1336. Brun induced the town to enter the Swiss Confederation (1351). Later he was won over to the Austrian side, and induced the town in 1356 to make an alliance with Austria, with which the Confederation had made peace in 1355. See Life by Hottinger in *Schweiz Museum*; vol. I. (1837);

Blüntschi's *Geschichte der Republik Zürich* (3 vols. 1847-57).

Brunamonti, MARIA ALINDA (1842-1903), Italian poetess, born in Perugia; published her first book in 1866, and between 1859 and 1878 issued various *Canti Nazionali*. These and other poems were collected in 1875, and in 1887 augmented by a volume of *Nuovi Canti*. In these verses patriotic and religious fervour are united to genuine poetic feeling.

Brunanburh, a place in the north of England, where Athelstan and his brother Radmund, in 937, won a decisive victory over Anlaf of Dublin, Constantine of Scotland, the Celtic king of Northumberland, and the Northumbrian Danes, the battle practically establishing the unity of England for many years. The site of Brunanburh is uncertain, but it has been variously located in Northumbria, in Yorkshire, Ramber Bridge in Lancashire, and Bruns- wark or Birrenswark in Dumfriesshire. The battle was commemorated by a stirring alliterative ballad contained in the Anglo-Saxon Chronicle, and in the *Saga of Egil Skallagrimsson* (trans. by W. G. Green, 1893). The most spirited version is that of Lord Tennyson.

Brunck, RICHARD FRANÇOIS PHILIPPE (1729-1803), one of the greatest classical scholars of the 18th century, was born at Strassburg. After serving for some time in the Seven Years' war (1756-63), he took up (1760) the study of Greek, and from 1776 devoted the greater part of his income as receiver of taxes to the issue of editions of the Greek authors, with emendations of the text. These included *Analecta Veterum Poetarum Græcorum* (1772-6), *Anacreon* (1773), *Apollonius Rhodius* (1780), *Aristophanes* (1781-3), *Gnomici Poetæ Græci* (1778), and *Sophocles* (1786-9).

Brundisium. See BRINDISI.

Brune, GUILLAUME MARIE ANNE (1763-1815), marshal of France under Napoleon, served in the army of the revolution under Dumouriez (1793). After establishing the Helvetic republic in Switzerland and the Batavian republic in Holland, and defeating the Duke of York at Bergen in Holland (1799), he was deputed in 1800 to suppress the Chouan rebellion. In the same year he was named commander-in-chief in Italy, and defeated the Austrians on the Mincio. In 1803 he was sent as ambassador to Constantinople, and during his absence was created (1804) a marshal. He was appointed French governor of the Hanseatic League towns in 1806, and captured (1807) Stralsund and Rügen. At Napoleon's first abdication he joined Louis XVIII., whom he deserted during the Hundred Days, but rejoined after Waterloo. He was murdered at Avignon by a royalist mob (1815). See *Vie de Brune* (1887); and Marmaiton, *Le Maréchal Brune* (1900).

Brunel, British protectorate in N.W. Borneo, between British N. Borneo and Sarawak. It was until 1888 an independent (Mohammedan) territory, and its sultan was at one time overlord of the whole island. The population is estimated at about 30,000. Area, 4,000 sq. m. Brunel, the capital (pop. 10,000), is mostly built on piles. Valuable coal is found. The chief export is sago. See Alleyne Ireland's *Far Eastern Tropics* (1905).

Brunel, ISAMBARD KINGDOM (1806-59), English civil engineer, was the only son of Sir Marc Isambard Brunel; entered his father's office in 1823. He assisted in the two great undertakings—his father's block machinery and the Thames Tunnel (1825-43). Upon his own account he constructed (1831) Monkwearmouth Docks, and many other

works of a similar character; and he designed (1831) the plans for the Clifton Suspension Bridge, though the bridge was not completed (1864) until after his death. As engineer (1833-46) to the Great Western Railway, he persuaded the directors, after much controversy, to adopt the broad gauge. His last great railway undertaking was the Royal Albert Bridge of the Cornwall Railway at Saltash (1853-9). Brunel was also one of the pioneers in the development of ocean steam-navigation. He designed the *Great Western* steamship, which was the first to make regular voyages (1838) across the Atlantic. He next built the *Great Britain*, the first large iron steamship which was navigated (1845) by the screw propeller. Under the auspices of the Eastern Steam Navigation Company, he began (1853) the construction of the huge *Great Eastern*. Brunel gave much attention to gun improvement, and designed a floating gun-carriage for the attack on Kronstadt in 1854. He also designed and erected the hospital buildings at Renkioi, on the Dardanelles, in 1855. He was seized with paralysis on board the *Great Eastern*, Sept. 5, 1859, and died ten days afterwards. See *Life*, by his son, Isidore Brunel (1870).

Brunel, SIR MARC ISAMBARD (1769-1849), engineer, was the son of a farmer and landowner in Normandy. Obligated to leave France in 1793 on account of his royalist opinions, he settled temporarily in the United States, and began business as an engineer. In 1799 he came to England, and persuaded the Admiralty to accept his designs for making ship blocks by machinery. The invention was perfected in 1806, and Brunel was awarded a sum of £17,000. In 1824 the Duke of Wellington accepted his plan for the construction of a tunnel be-

neath the bed of the Thames. The work was completed in 1843, with the assistance of his son. Brunel's inventions included machines for knitting, for ruling paper, for manufacturing nails, for making druggists' boxes, and for making seamless shoes for the army. He was knighted in 1841. See Beamish's *Memoirs of Sir Marc Brunel* (1862).

Brunelleschi, FILIPPO (1377-1446), Italian architect and sculptor, was born at Florence. He promoted the restoration of the ancient classical style of architecture as a substitute for Gothic. His first great work was the church of San Lorenzo in Florence; and in 1418 he became architect of the unfinished cathedral of Florence, for which he designed the great dome, the largest in the world, imitated by Michael Angelo in the design for that of St. Peter's. He was also the architect of the Pitti Palace, and of the chapel of the Pazzi, Florence. See *Life* by Manetti (ed. Milanese, 1887); and Scott, *F. di ser Brunelleschi* (1901).

Brunetière, FERDINAND (1849-1906), born at Toulon, member of the French Academy since 1893, one of the most influential of modern French critics. From 1875 he contributed regularly to the *Revue des Deux Mondes*, of which he was editor. His articles were collected from time to time in series, entitled *Etudes Critiques sur l'Histoire de la Littérature Française* (6 vols. 1880-98), *Questions de Critique* (2 vols. 1889-90), *Essai sur la Littérature Contemporaine* (2 vols. 1892-5), and *Histoire et Littérature* (3 vols. 1884-87). He confirmed his reputation and achieved considerable popularity by four series of lectures dealing respectively with *Evolution des Genres dans l'Histoire de la Littérature* (1890), *Epoques du Théâtre Français* (1892), *Evolution de la Poésie Lyrique en France*

au XIX^e Siècle (2 vols. 1893; 3rd ed. 1900-1), and *Bossuet* (unpublished). His work is characterized by wide and accurate knowledge, and it would be difficult to find his equal in tracing a tendency in literature, or in stating an author's relationship to his predecessors. He was an extreme classicist, holding that French literature attained its perfection in the reign of Louis XIV., and that earlier literature was but a preparation, and subsequent literature a decadence. He, accordingly, hardly did justice to the middle ages, and, on the other hand, never ceased to oppose, since his *Roman Naturaliste* (1883), the realistic school of modern literature. He will be best remembered by his application of the theory of evolution to the study of literature. His later publications include *La Science et la Religion* (1895); *Education et Instruction* (1895); *La Renaissance de l'Idéalisme* (1896); *La Moralité de la Doctrine Evolutive* (1896); *L'Art et la Morale* (1898); *L'Idée de Patrie* (1897); *Les Ennemis de l'Âme Française* (1899); *Manuel de l'Histoire de la Littérature Française* (1898; Eng. trans. 1898); *Brunetière's Essays in French Literature*, trans. by D. Nichol Smith (1898); *Histoire de la Litt. Française Classique* (1905, etc.).

Brunhilda, the name of two queens. (1.) The Brunhild of the *Nibelungenlied*, queen of Iceland, wife of Gunther, who procured the murder by Hagen of Kriemhild's husband Siegfried. She is identified with Brynhilda, a beautiful maiden, one of the Valkyrie, in Norse mythology, whom Odin deprived of her divinity, and throw into a deep sleep, from which Sigurd awakened her. (2.) The other Brunhilda was a Visigoth princess, married (567) to Sigbert, king of Austrasia, and became (596) regent for her

two grandsons in the rule of half the Frankish kingdom, Fredegond ruling the other half for Clotaire II. On Fredegond's death (598) she became sole Merovingian queen, but was deposed and killed in 613.

Bruni, isl. of Tasmania, 32 m. long, with an area of 160 sq. m., in W. of Storm Bay, and 15 m. S. of Hobart Town; there is a light-house on S. end.

Bruni, LEONARDO (1369-1444), Italian humanist and historian, was born at Arezzo, devoted his youth to the study of the classics, and was papal secretary under four Popes (1405-15). He then retired to Florence, of which city he became the historian and (in 1427) the chancellor. Bruni's *Historiarum Florentinarum Libri XII* (printed at Strassburg, 1610; a modern edition, Florence, 1856-60) is a monument of research; and his *Commentarius Rerum suo Tempore Gestarum* (vol. xix. of Muratori's *Script. Rerum Ital.*) and *Epistola Familiares* (Florence, 1742) are full of interest regarding the history of the time. Though small in compass, the best known of Bruni's writings is the *Vita* of Dante, one of the most valuable of the early lives of the poet (Eng. trans. by P. H. Wicksteed, Hull, 1898). See C. Monzani's '*Vita di L. Bruni Aretino*,' in the *Arch. Stor. Ital.* (2nd series, vol. v. 1861).

Brünig Pass (3,396 ft.) leads from the Swiss canton of Unterwalden and Lucerne to that of Bern, reached at Meiringen in the Hasli or Upper Aar valley. It is extremely easy. Since 1888 it has been traversed by a little mountain railway.

Brünn, tn. and episc. see, cap. of Moravia, Austria, 70 m. N.N.E. of Vienna, at the foot of the Spielberg, an isolated hill rising 185 ft. above the town, and crowned with a citadel which from 1621 to 1855 served as

an imperial state prison, where, among other political offenders, Baron von der Trenck (1746-9) and the Italian poet Silvio Pellico (1822-30) were incarcerated. Among the churches the most noteworthy are the cathedral (15th century) and the Gothic church of St. James. There are also the handsome meeting-house of the Moravian Estates (built in 1876-81), the national (Franz) museum, the Moravian industrial art school, the technical high school, the picture gallery, and the blind institute for Moravia and Sillesia. Brünn is one of the busiest industrial towns in the Austrian empire. Woollen factories are the most important; but the manufacture of machinery, leather, gloves, hats, chemicals, sugar, starch, spirits, brewing, dyeing, flour-milling, and brick-making, are carried on on a large scale. The town was besieged, but in vain, by the Hussites in 1428, by the Bohemian king George Podiebrad in 1467, by the Swedes in 1645, by the Prussians in 1742, and by the French in 1805; but the last named forced it to capitulate four years later. Pop. 110,000—of whom rather less than one-half are of Czech race, the rest being mostly of Teutonic descent.

Brunne, ROBERT OF. See MANNING, ROBERT.

Brunnen, vil. (much frequented in summer), Switzerland, on the N. shore of the L. of Lucerne, and in the canton of Schwyz. It is on the St. Gothard line, 18 m. E. by S. of Lucerne.

Brunner, HEINRICH (1840), German lawyer, born at Wels, Upper Austria. Since 1873 he has been professor of the history of law at the Berlin University. His works on the history of German, Frank, Norman, and Anglo-Norman jurisprudence are of great value—*Das Anglo-Normannische Erbfolgersystem* (1869); *Das Gerichtszeugnis und die Fränk-*

ische Königsurkunde (1873); *Mithio und Sperantes* (1885); *Zur Rechtsgeschichte der Römischen und Germanischen Urkunde* (1880). His two principal works are, however, *Die Entstehung der Schwurgerichte* (1871), in which he shows the relation between the English jury system and the Frankish methods of legal procedure, the connecting link being the Normans, and *Deutsche Rechtsgeschichte* (2 vols. 1887-92).

Brunnow, ERNST PHILIPP, COUNT VON (1797-1875), Russian diplomatist, was born at Dresden. After acting for Russia at the congress of Laibach, and in Turkey and the Hague, he was appointed ambassador to London in 1840, when he effected the convention which settled temporarily the affairs of the East on a satisfactory footing. Here he remained until the outbreak of the Crimean war (1854). He took part with Orlov (Orloff) in the Paris Conference (1856), and signed the treaty of peace. In 1858 he returned to London, and remained there until 1874.

Bruno, GIORDANO (?1550-1600), Italian philosopher, was born at Nola, in the kingdom of Naples. In his youth he was a Dominican monk, but fled (1576) to Switzerland on account of his heretical opinions. After spending two years (1577-9) in Geneva, he proceeded to Toulouse, and finally (1581) to Paris, where, in 1582, he published a satirical comedy, *Il Candelaio*, in which he ridiculed several classes and professions. Bruno next gave lectures on philosophy, and strongly attacked the Aristotelians. Thereafter he visited England (1583), where he contracted a friendship with Sir Philip Sidney, to whom he dedicated his two next works, the *Spaccio della Bestia Trionfante* (or 'Expulsion of the Triumphant Beast'), an attack upon Rome; and the *Cena delle Ceneri* (or

'Evening Conversations on Ash Wednesday'), in which the author defended the Copernican system of astronomy. Bruno's *Della Causa Principio ed Uno* (1584) and his *Del Infinito Universo e Mondi* (1584) are his chief metaphysical works, and in these he developed a pantheistic system. Bruno's philosophy seems to have attracted and influenced Spinoza, Descartes, Schelling, and other thinkers. He afterwards obtained (1586) a professorship at Wittenberg, where he published in 1587 his treatise *De Lampade Combinatoria Lulliana*. In 1592 he returned to Italy, but was at length arrested (1593) and imprisoned by the Inquisition. Refusing to recant his heresies, he was condemned to death, and was burnt at the stake in Rome (Feb. 17, 1600). His Italian writings were published by Dr. Wagner in 1830, and by P. de Lagarde in 1888-9; those in Latin by Gfrörer in 1834, and by Fiorentino in 1880-91. See the *Life of G. Bruno, the Nolan*, by Miss J. Frith (1887); *G. Bruno*, by L. M'Intyre (1903); and in German by A. Riehl (1900), Louis (1900), and Zandsack (1891); and see also the edition of his *Works* by F. Tocco (1891).

Bruno, ST. (c. 1040-1101), was born at Cologne, and became a canon of Rheims, and director of the schools of the diocese. In 1040, with six companions, he retired to the desert near Grenoble and founded the Carthusian order (1084). (See **CARTHUSIANS**.) Pope Urban II. summoned him to Rome; but after a few years of the papal court he retired (1094) into Calabria, where he founded a second Carthusian monastery at Della Torre. He was canonized in 1628. His day is October 6. See the *Acta Sanctorum*, and *Lives*, in German, by Löbbel (1899) and Gorse (1902).

Bruno THE GREAT (925-965), archbishop of Cologne (953) and

Duke of Lorraine (954), was son of Henry the Fowler and brother of Otho I. A celebrated scholar and statesman, he reconciled his brother and the French court, and is credited with the authorship of a commentary on the Pentateuch and of a work on the lives of the saints.

Brunow, **LUDWIG** (1843), German sculptor, born in the duchy of Mecklenburg-Schwerin. In 1871 Moltke gave him a sitting for a bust in bronze: in consequence of this he obtained the order for the *Moltke Memorial* (1875) at Parchim. In 1880 he executed two colossal statues of *Frederick I.* and *Frederick William II.* for Berlin. In 1886 he finished the statue of *Gustavus Adolphus* for Lützen, in 1893 a colossal equestrian statue of the *Grand Duke of Schwerin*, and in 1905 executed a bust of *Friedrich Wilhelm I.* Besides these works, he has produced the following groups: *The Love Messenger*; *The Realization of the Dream*; *The Bride of Corinth*, after Goethe; and a *Pegasus* for the National Theatre at Frankfort-on-the-Main.

Brunsbüttel, seapt. tn., prov. Schleswig-Holstein, Prussia, at mouth of riv. Elbe, 15 m. E. of Cuxhaven. The North Sea-Baltic Canal terminates in two locks at this place. Pop. 2,500.

Brunswick (Ger. *Braunschweig*). (1.) A sovereign duchy of the German empire, embracing five small enclaves and three larger divisions, surrounded by the provinces of Hanover, Saxony, and Westphalia. The N. division is, on the whole, fertile, and consists partly of undulating hills, offshoots of the Harz Mts. It partly merges into the Lüneburg Heath. The two S. divisions belong to the Harz and Weser Mts., while the river Weser crosses the W. division. Area, 1,424 sq. m. Pop. 500,000, the majority be-

ing Lutherans. The leading industries are agriculture (especially cattle-grazing and fruit-growing), mining (lignite, iron, asphalt) in the Harz, and some manufacturing (chiefly sugar, sulphuric acid, beer, and spirits). The duchy includes extensive forests. It has two votes in the Imperial Federal Council, and sends three representatives to the Imperial Diet. Originally Brunswick formed part of the duchy of Saxony, but in 1235 the independent duchy of Brunswick was created. Subsequently, along with Hanover, Lüneburg, Celle, and other territories, it was transferred and reconveyed several times as the various Brunswick dynasties were founded and died out. The direct Welf (Guelf) line became extinct in 1884, and since 1885 the duchy has been governed by a regent. (2.) Town, cap. of above, 32 m. by rail S.E. of Hanover. The central portions consist of the old town, built in typical German architectural style, surrounded by a chain of parks. Among the noteworthy public buildings are the cathedral (1172), containing the tomb of Henry the Lion, Duke of Saxony, and the ducal palace, with fine collections of pictures, majolica, and gems, among the finest in Germany. Spohr, the musician (1784), and the mathematician Gauss (1777) were born here, and Lessing died in the town (1781). The principal manufactures are jute-spinning, printing, the manufacture of sewing-machines, sugar, gold and silver wares. Pop. 140,000. The town owed much of its importance to the fact that it stood at the intersection of the trade routes from the Rhine to the Elbe and from Hamburg to Leipzig, and to its alliance with the Hanseatic towns (1274). (3.) City of Georgia, U.S.A., co. seat of Glynn co., situated on the Atlantic coast,

70 m. s.s.w. of Savannah. It has an excellent harbour, and commerce in cotton and lumber, and is visited as a summer and winter resort. Pop. 10,000. (4.) Town of Cumberland co., Maine, U.S.A., on the Androscoggin R., 25 m. N.E. of Portland, with which it is connected by the Maine Central Ry. It is the seat of Bowdoin College, and of the medical school of Maine. Flour, patent medicines, and canned goods are manufactured. Pop. 7,000. (5.) Town, Victoria, Australia, 3 m. N. of Melbourne, of which it is an industrial suburb. It has potteries and brickworks, iron foundries and sawmills. Pop. 24,000.

Brunswick, FRIEDRICH WILHELM, DUKE OF (1771-1815), fourth son of Duke Ferdinand, served in the Prussian army in the war against France (1792), and on the death of his father in 1806 continued his opposition to Napoleon, who abolished the duchy at the peace of Tilsit in 1808. In 1809 he cut his way through Germany, shipped to Heligoland, reached England, and served under Wellington in the Peninsula. Reinstated in his duchy by the allies in 1813, he afterwards took part in the campaign of 1814-15, and was killed at Quatre Bras. See *Life* by Spehr (1865).

Brunswick Black, a varnish composed of asphalt or pitch, linseed oil, and turpentine; used to give a glossy appearance to metal and other articles. Berlin black is a finer variety of the varnish.

Brunswick Green. See PIGMENTS.

Brunton, SIR THOMAS LAUDER (1844), consulting physician to St. Bartholomew's Hospital, London, was born in Roxburghshire, and educated at Edinburgh University. His first appointment was as lecturer on materia medica at the Middlesex Hospital in 1870, and in the following year he was appointed to St. Bartholomew's

Hospital. In 1886 he went to Paris to examine Pasteur's system of treatment for hydrophobia, and has also reported on the action of chloroform and of snake poisons. He has attended many distinguished patients, including King Edward VII. His principal publications are: *Text-Book of Pharmacology* (1892), *The Action of Medicines* (1897), *Disorders of Assimilation* (1901), *Circulation and Respiration* (1907), and *Therapeutics of the Circulation* (1908). He is also the author of *The Bible and Science* (1881).

Brunton, WILLIAM (1777-1851), Scottish mechanical engineer and inventor, son of a Dalkeith watchmaker, was known chiefly for his improvements in metallurgy; for his pioneer work in steam navigation (1814); for the curious walking machine—the 'steam-horse' (1813); and for his improved ventilation of collieries (1851).

Brusa, or BROUSSA, tn., Asiatic Turkey, at the base of Mt. Olympus or Koshish Dag, 60 m. s. by E. of Constantinople; has important silk manufactures, and produces fruit and wine. It is the seat of an archbishop of the Greek and of the Armenian Church. Near it are iron and sulphur springs, known formerly as Pithya. Connected by rail (26 m.) with its port, Mudania. Under the name of Prusa it was the capital of Bithynia, and for some years the residence of the younger Pliny. In 1329 it was captured by Orkhan, the chief of the Ottoman Turks; burnt by the Mongols (1402); occupied by Ibrahim Pasha of Egypt (1833); and nearly destroyed by an earthquake in 1855. Pop. 76,000.

Brush, CHARLES FRANCIS (1849), American electrician, was born at Euclid, Ohio, and is the inventor and manufacturer of arc lamps, the Brush dynamo, etc., and founder of the Brush Electric Co.

In 1899 he received the Royal Society's Rumford medal.

Brushes. A great variety of material is employed, according to the purpose for which the brushes are to be used. For coarse work, twigs of broom, birch, heather, and rushes are generally employed; also rope, yarn, and the fibre of cane, cocoanut, and many other plants. Scratch brushes for cleaning metal surfaces are made of wire; brushes for working in acids are made of spun glass. Small brushes are known as pencils, and for these the carefully-chosen hair of certain animals is used. For artists' pencils sable is the best and dearest, but the hair from the camel, the ichneumon, and the cow's ear is much used. Varnishing brushes, being rather coarse, are made from bears' fur; while hadders' hair, being long and elastic, is used for graining and gilding. By far the greatest number of brushes are made from pigs' bristles, obtained from Russia and Poland. They are classified according to colour, quality, length, and coarseness; and the whites are further bleached for particular purposes, such as tooth-brushes.

Brushes are divided into two classes, simple and compound—the former consisting of one tuft, the latter of many. Simple flat or round brushes are made by fastening a bundle of arranged bristles into the specially-shaped socket. In the manufacture of artists' brushes, the hairs, after cleaning, are arranged in bunches, the point being formed very carefully. This work needs delicate touch, and is done by women and children. The bunch is then tied and inserted in a quill which has previously been expanded by heating in hot water. On drying it contracts, holding the bunch securely. Metal caps are also used in place of quills. Other brushes are made of broom-corn and of feathers.

Compound brushes may be 'set' or 'drawn.' In the former, the tuft is fastened directly into the hole bored in the stock or head; in the latter, the bristles are bent double across a wire, which is then used as a loop to draw the tuft into position. Compound brushes are made chiefly by the Woodbury machine. Many materials other than wood—such as celluloid, ebonite, and metal—are used for stocks and handles. Bottle-brushes are made by fastening the bristles between two wires and allowing them to project on both sides. The wires are then twisted firmly together.

In electro-technics brushes are strips of copper gauge or carbon rods which convey the current from the terminals of an electric motor to the commutator, or in the case of a dynamo in the reverse direction.

Brush Turkey, the popular name of *Cathartus lathamii*, of the order Gallinae, which includes all domesticated poultry. The birds are natives of Australia, about the size of the common turkey, blackish brown in colour, and construct mounds in which the eggs are laid. See also MOUND BIRDS.

Brussels (Fr. *Bruxelles*), the capital of Belgium, stands near the middle of the country, 27 m. by rails. of Antwerp. The modern city is handsome, and has a ring of large industrial suburbs (Schaerbeek, St. Josse ten Noode, Ixelles, St. Gilles, Molenbeek St. Jean, Laeken, Anderlecht, and Etterbeek), separated from it by a girdle of exceptionally wide boulevards. In the heart of it, towards the N.W., is the older and lower town, inhabited chiefly by Flemings. Among the many fine buildings, the massive and modern pile of the Palais de Justice (1866-83) must rank first; the Hôtel de Ville (1402-54), the Brood Huis ('Bread House'), and the guild

houses are unique ornaments of the picturesque old market-place. The cathedral of St. Gudule is renowned for its statues, painted glass, and carved pulpit. In the park are the ministries of state and Belgian houses of parliament at its northern end, and at its southern the royal palace and the palace presented to William II. in 1829 by the nation, and now used by the academies of science, fine arts, and medicine. The palace of the fine arts and the museum of modern paintings are both extremely rich in works by the great Flemish masters. East of the park is the handsome and aristocratic (French) quarter of Léopold. Still farther east are the royal museum of the industrial and decorative arts (Palace of the Cinquantenaire), the museum of education, the museum of natural history, and the unique Wiertz museum. In April 1910 an international exhibition was opened by King Albert. Later it was partially destroyed by fire, in which the British section suffered considerably.

Brussels, together with her suburbs, is the seat of considerable industries, especially the manufacture of lace, furniture, bronzes, woollen, fine cottons, vehicles, etc. There is connection by canal with the Scheldt, with Ostend, and with the Sambre; and an extensive port has been constructed at Laeken, to the N.E.

Brussels is said to date from the 6th century. In the 11th it was chosen by the Duke of Lower Burgundy as his capital, and in 1477 it became the capital of Austrian Netherlands. Between 1815 and 1830 it was, alternately with the Hague, capital of the Netherlands, and in 1830 became capital of the new kingdom of Belgium. In 1695 the older town suffered from a bombardment by Marshal Villeroy. It was the centre of a flourishing school of art in the

19th century. Pop. 200,000, or including suburbs, 720,000. See Gilliat-Smith's *The Story of Brussels* (1906).

Brussels Conferences. Several international conferences have been held at Brussels—e.g. in 1874 an international declaration was drawn up defining the laws and usages of civilized warfare. (See BELLIGERENTS, RIGHTS AND DUTIES OF.) For a full discussion, see H. Wheaton's *International Law* (new ed. 1904). In 1876, Leopold, king of the Belgians, summoned to a conference at Brussels representatives—entirely unofficial—of the great powers, in order to decide upon the best methods for the exploration and opening up of Africa to European trade and civilization. It resulted eventually in the creation of the Congo Free State. In 1899-1900 another conference took place in the same city, for the suppression of the slave trade in Africa.

Brussels Sprouts, like the cabbage, cauliflower, and broccoli, a form of *Brassica oleracea*, is distinguished from the cabbage in the growth of small heads (each of them a miniature cabbage) in the axils of the leaves for the whole length of the stem, the leaves being cut away as the buds develop. Its cultivation is similar to that of the cabbage, a deep rich soil being necessary to bring it to perfection. Seeds are sown in February or March, and the plants should be set in the ground about twenty inches apart.

Brussels Sugar Convention. In 1893, and again in 1901-2, the representatives of the powers assembled at Brussels to discuss the abolition of bounties on the export of sugar, this result being finally achieved by an agreement dated March 1902. By this convention the powers (Great Britain, Germany, Austria-Hungary, Italy, the Netherlands, and Sweden)

undertake to suppress the direct and indirect bounties by which the production or export of sugar might benefit, and not to establish bounties of such a kind during the duration of the convention. In August 1903 the British Parliament passed the Sugar Convention Act, for prohibiting the importation of bounty-fed sugar. Opponents of the convention affirm that we now pay considerably more for sugar, and that the benefit to the West Indies is altogether out of proportion to the injury inflicted on the home consumers and the confectionery trades. Supporters of the convention urge that the increase in price is due merely to drought. They point out that bounties are unfair, and should be abolished whatever the result, and they believe that in time the convention will tend to increase production and to steady low prices. See SUGAR.

Brut, or **BRUTUS**, the hero of Troy, was great-grandson of Æneas, and on his banishment from Italy managed to reach Albion (Britain), whose gigantic warriors he overcame in battle, and took possession of the island. See Wace's *Brut* or *Geste des Bretons* (ed. Leroux de Lincy, 1836-8).

Brütt, **ADOLF** (1855), German sculptor, born at Husum; studied at Berlin. Among his works are *Saved* (1887) and *Eve with her Children* (1890), both in the National Gallery at Berlin. He executed in 1894 the *Emperor William I. Memorial* at Kiel, and in 1897 the *Bismarck Memorial* at Altona. For the Siegesallee in Berlin he produced *Margrave Otto the Indolent* (1899) and *King Frederick William II.* (1900). Other works are *The Emperor Frederick III.* (1903); *The Emperor William I.*, in Berlin; *Diana* (1903), in the National Gallery, Berlin. His statues are distinguished by close

and delicate fidelity to nature, and by energetic characterization.

Brütt, **Ferdinand** (1849), German painter, born at Hamburg; has lived mostly in Düsseldorf. His early canvases deal with peasant life—as, *A Peasant Deputation*, *The Hope of the Country*, and *Rest Disturbed*; but since 1880 he has made a speciality of town life, and has produced some remarkably good pictures in *Convicted* (now in the Hamburg Museum), *Acquitted*, *A Difficult Choice*, *On the Stock Exchange* (1888), and *The Peasant in Court* (1890), now at the Berlin Museum.

Bruttium, ancient name of the south extremity or 'toe' of Italy. The sea-coast was occupied almost entirely by Greek colonies; the interior was held by the Bruttii, who were subdued by Rome in 272 B.C. In the second Punic war they helped Hannibal, and after its conclusion their territory was confiscated.

Brutus, a Roman family of the Junian clan, of which the most famous members were:—(1.) **LUCIUS JUNIUS BRUTUS**, son of M. Junius and Tarquinia, sister of Tarquinius Superbus. When this king murdered his possible rivals, Lucius saved himself by pretending to be an idiot; hence his name Brutus, 'the imbecile.' After the foul outrage on Lucretia, Brutus vowed vengeance on the Tarquins, and roused the people to expel the king and his family. He became the first consul of Rome in 509 B.C., and executed his two sons, who were found guilty of a conspiracy to restore the Tarquins. Brutus fell the same year, fighting against Aruns, son of Tarquinius.

(2.) **MARCUS JUNIUS BRUTUS** (85-42 B.C.). By Cato he was imbued with a love of learning, which he retained throughout life. On the outbreak of the civil war in 49 he joined Pompey, and fought with distinction near Dyrrachium. After Pharsalia, in 48, he asked

and obtained pardon from Cæsar. In 46 Cæsar made him governor of Cisalpine Gaul. In 44 he was prætor, and, for no obvious reason, except that his great vanity and weak will succumbed to Gaius Cassius's strong persuasions, joined the conspirators who murdered Cæsar on March 15. (Cæsar's dying words, 'Et tu, Brute,' do not refer to Marcus, but to (3), who was a great friend and one of his heirs.) In 42 he and Cassius fought Antony and Augustus at Philippi: in a first engagement, Brutus defeated Augustus, while Cassius lost to Antony; in a second encounter, three weeks later, Brutus was completely defeated, and killed himself. His flagrant treachery to Cæsar justifies Dante in coupling him with Judas Iscariot and Cassius as undergoing the extreme punishment in hell. See Plutarch's *Lives* and Cicero's *Letters*, where Brutus is revealed in his true colours; Shakespeare's *Julius Cæsar*, in which the conception of his character is misleading, but, taken as it stands, has been very finely discussed by A. Goll's *Criminals of Shakespeare* (1909).

(3.) DECIMUS JUNIUS BRUTUS ALBINUS, another of the murderers of Cæsar, the hero of 'Et tu, Brute!' In 49 he commanded Cæsar's fleet which took Massilia, where he remained true to Cæsar, in spite of Mark Antony's attempts to draw him into a plot against Cæsar's life. After Cæsar's death he went to his province, Cisalpine Gaul; but the coalition of Antony, Lepidus, and Augustus induced him to attempt to join Marcus Brutus in Macedonia. On his way he was betrayed by a Gaulish chieftain to Antony, who had him put to death. See Boissier's *Cicero and his Friends* (1897).

Bruun, CHRISTIAN WALTHER (1831), Danish author and bibliographer, born at Copenhagen; was appointed (1863) director of the National Library at Copen-

hagen. He edited *Bibliotheca Danica, 1482-1830* (1873-96); *Danske Samlinger for Historie, Topographie, Personal- og Litteratur-Historie* (1865-79); *Holbergs Epistler* (1865-75); and *Viser fra Reformationstiden* (1864); and written *Frederik Rostgaard og hans Samtid* (2 vols. 1870-1); *Curt Sivertsen Adelaer* (1871); *Slaget paa Kolberger Reede* (1879); *Gunde Rosenkrantz* (1885); *Kaj Lykke til Gisselsfeld* (1886); and *Peter F. Suhm* (1898).

Brüx, *tu.*, Bohemia, Austria, at the s. foot of the Erzgebirge, 45 m. N.W. of Prague, with lignite mines and manufacture of sugar, agricultural machinery, and spirits. Pop. 22,000.

Bruxelles. See BRUSSELS.

Bruyère. See LA BRUYÈRE.

Bry, or BRIE, THÉODORE DE (1528-98), goldsmith, engraver, and painter, was born at Liège. When a young man he spent some time in London, where he executed two engravings, now rare—viz. *The Procession of the Knights of the Garter in 1556* (12 plates), from M. Geeraerts; and *The Funeral of Sir Philip Sidney* (34 plates), from T. Lant. With his sons, Jean Théodore and Jean Israël (d. 1611), he published several illustrated books of travel, the best known being *Collectiones Peregrinationum in Indiam Orientalem et Occidentalem* (6 vols. 1590-9). This monumental work was continued by his sons, being published in 19 vols. (1599-1634) with Latin text, though some parts are in English, French, and German.—JEAN THÉODORE (1561-1623), son of above, was born at Strassburg. As an artistic engraver he was better known than his father, and executed *The Triumph of Bacchus*, *The Triumph of Jesus Christ*, *The Marriage of Isaac and Rebekah*, in the form of a frieze.

Bryan, ELMER BURRITT (1865), American educator, was born at

Van Wert, Ohio, and graduated at Harvard and Clark Universities. He was for some time superintendent of education in the Philippine Islands. Subsequent appointments have been as professor of psychology in Indiana University (1903), president of Franklin College (1905), and president of Colgate University (1909). His publications include *The Basis of Practical Teaching* and *The Longer Life*.

Bryan, WILLIAM JENNINGS (1860), Democratic candidate for the United States presidency, was born at Salem, Illinois. In 1888 he started as a lawyer at Lincoln, Nebraska. In 1890 he was elected for Illinois to Congress, where his success as an orator was immediate. In 1894 he became editor of the *Omaha World Herald*, and lectured through the country on free silver. In 1896 he was selected as the Democratic candidate for the presidency against M'Kinley. The contest was a battle between gold and silver—M'Kinley supporting the retention of the gold standard, and Bryan advocating the cause of the free coinage of silver. M'Kinley became president. In 1900 M'Kinley was again successful, with Bryan as his opponent. Mr. Bryan was once more (1908) brought forward as a candidate for the presidency, but was severely defeated by Mr. Taft. He has published *The First Battle* (1897), and *The Old World and its Ways* (1907). A volume of his *Speeches* has been published (1910).

Bryan, WILLIAM LOWE (1860), American author, born in Indiana, U.S.A., has been professor of philosophy since 1887, vice-president (1893-1902) of Indiana University, and president since 1902. In 1889 he married Charlotta A. Lowe, psychologist, and in collaboration with her has written *Plato the Teacher: Selections from Plato* (1897); *The Republic of*

Plato (1898); and *The Acquisition of a Hierarchy of Habits* (1899).

Bryanites. See METHODISM.

Bryansk. See BRIANSK.

Bryant, JACOB (1715-1804), English antiquary, was private tutor, and afterwards (1756) secretary, to the Duke of Marlborough. His chief writings are *Analysis of Ancient Mythology* (1774-6), and *Gemmarum Antiquarum Delectus* (1781), a work on the Marlborough gems.

Bryant, WILLIAM CULLEN (1794-1878), American poet and journalist, was born in Hampshire, Massachusetts. In 1815 he was admitted to the bar, settling soon after at Great Barrington. Ultimately he gave up the law in favour of a literary life. Meanwhile he had been contributing poetry and prose to the *North American Review*; and his *Thanatopsis*, a fine poem in blank verse, was printed in that journal. In 1825 he removed to New York as editor of the *N. Y. Review*. That paper ceased publication a year later, and he became assistant editor of the *Evening Post*, being subsequently, in 1829, promoted to the editorship. Thenceforward for many years he devoted himself almost entirely to journalism, though in 1832 a collection of his poems appeared, which was reprinted in England through Washington Irving. In his old age he returned to poetry, and produced several notable pieces, besides metrical translations of the *Iliad* (1870) and the *Odyssey* (1871-2). His complete works were published in 4 vols. (1883-4). See the *Life* by his son-in-law, Parke Godwin (2 vols. 1883); the monograph by Bigelow in the American 'Men of Letters Series' (1890); and E. C. Stedman's *The Poets of America* (1885).

Bryce, DAVID (1803-76), Scottish architect, born in Edinburgh. He devoted himself largely to

the form of Gothic architecture known as 'Scottish Baronial,' in which style he built many castles and mansions. Among his public buildings in Edinburgh are Fettes College, Royal Infirmary, and Bank of Scotland. See *The Builder*, 27th May, 1876.

Bryce, GEORGE (1844), author and educationist, born at Mount Pleasant, Upper Canada. He was ordained a Presbyterian minister in 1871, and was appointed to Manitoba to organize a church and college. He was one of the founders of Manitoba University, and was the principal of Manitoba College (1877-1909), and president Royal Society of Canada (1909). His chief books are *Manitoba: its Infancy, Growth, and Present Condition* (1881); *Short History of the Canadian People* (1887); *Remarkable History of the Hudson's Bay Company* (1900); *Makers of Canada—Mackenzie, Selkirk, Simpson* (1905); *Everyman's Geology of Western Canada* (1907); and *The Romantic Settlement of Lord Selkirk's Colonists* (1909).

Bryce, RIGHT HON. JAMES (1838), statesman and man of letters, was born at Belfast. He was called to the bar in 1867, and entered the House of Commons in 1880 as the member for Tower Hamlets. In 1862 he published *The Holy Roman Empire* (20th ed. 1905), an expansion of his Arnold prize essay, and stepped into the front rank of historical writers. Since 1880 he has written a monumental work on *The American Commonwealth* (1888; new ed. 1910), *Two Centuries of Irish History, 1691-1870* (1888), *Impressions of S. Africa* (3rd ed. 1899), *Studies in History and Jurisprudence* (1901), and *Studies in Contemporary Biography* (1903). In Gladstone's short administration (February to August 1886), Mr. Bryce, who at the general election of 1885 had been elected for S. Aber-

deen, was under-secretary for foreign affairs, his chief being Lord Rosebery. In August 1892, when Gladstone was again in power, Mr. Bryce became Chancellor of the Duchy of Lancaster, with a seat in the cabinet; and in May 1894, on the resignation of A. J. Mundella, was promoted to be President of the Board of Trade in Lord Rosebery's administration. Here he remained till the defeat of the ministry on the cordite vote on June 21, 1895. The measures he has been instrumental in placing on the statute book include the City of London Parochial Charities Act (1883), the Guardianship of Infants Act, International Copyright Act (1886), Railway Rates Act (1894), and the Merchant Shipping Consolidation Act (1895). As President of the Board of Trade, he laid before Parliament (1895) a scheme for the construction of light railways. This was carried into law by his Conservative successor, Mr. Ritchie. During the Home Rule debates of 1886 and 1892, Mr. Bryce was a strenuous supporter of Mr. Gladstone's proposals. In January 1906 he was again elected for S. Aberdeen, and appointed (1905-6) Chief Secretary for Ireland, with a seat in the cabinet, which was followed in 1907 by his appointment as British ambassador at Washington, U.S.A. In this capacity he has been highly successful in promoting good relations between the U.S.A. and Canada. He was a member of the Royal Commission on the Medical Acts; and chairman of the Royal Commission on Secondary Education (1894). In 1902 he became one of the first fellows of the British Academy, and chairman of its historical and archaeological committee.

Brydges, SIR SAMUEL EGER-TON (1762-1837), barrister and author. He did valuable work

as a genealogist in his edition of Collins's *Perrage of England* (1812), as a bibliographer in his *British Bibliographer* (1810-14) and *Censura Literaria* (1805-9), and most of all as an editor of early English literature by reprints, executed (1812-18) at his press at Lee Priory, of many rare and interesting treatises. See his *Autobiography* (1834).

Bryennios, PHILOTHEOS (1833), Greek theologian, was born at Constantinople. He represented the Greek Church at the Old Catholic conference at Bonn in 1875, and was chosen metropolitan (archbishop) of Serres (1875), and of Nicomedia (1877). In 1873 he discovered, in a monastery at Constantinople, the first complete MS. of the *Clementine Epistles* (pub. 1875), and the MS. of *The Teaching of the Twelve Apostles* (pub. 1883).

Brymner, DOUGLAS (1823-1903), Canadian archivist, born at Greenock, Scotland. He went to Canada in 1857, settling first in the Eastern Townships, Lower Canada, and later in Montreal, as journalist. In 1872 he was appointed to collect, take charge, and organize the department of archives, continuing in office for thirty-one years. His collection of manuscripts—English and French, originals and copies—amounts to 3,155 volumes, and his reports, published by the Department of Agriculture, contain synopses of the several papers and extracts from the more important of them. See *Dominion Archives* (from 1872).

Bryniolf, BISHOP (1605-75), Icelandic ecclesiastic, bishop of Skalholt (1639-75), made a valuable collection of old Icelandic MSS., many of which were sent by him to the king's library at Copenhagen by the hands of the traveller Thormod Torfæus; but a large proportion of the remainder perished soon after his death. See

G. Vigfusson and F. Y. Powell's *Corpus Poeticum Boreale* (1883).

Brynmawr, tn., Brecknockshire, Wales, on L. & N.W.R., 8 m. W. by S. of Abergavenny; has extensive coal mines and iron works. Pop. 7,000.

Bryology, the science of mosses. See MOSSES.

Bryony. Two climbing plants, both common in Britain, are popularly known as bryony, being distinguished, according to the colour of their tuberous roots, as white and black bryony. These two plants, though both climbers with perennial roots, annual stems, and berries which turn red in autumn, are really unrelated to each other. The white bryony (*Bryonia dioica*) belongs to the order of Cucurbitaceæ, or gourds; the black species (*Tamus communis*) is a member of the order of Dioscoreaceæ, or yams. The former bears palmate leaves, with tendrils at their bases, and round berries; whereas the latter bears heart-shaped leaves and elliptical berries. The black bryony sometimes goes by the name of Our Lady's seal, and its fruit once had much reputation as a cure for freckles.

Bryophyta, the name given to a division of the higher flowerless plants, comprising the Musci and Hepaticæ. See MOSSES and LIVERWORTS.

Bryozoa ('moss animals'), a name of the POLYZOA.

Bryum, a large genus of common mosses, forming small, dense patches on damp earth and rocks. The capsules are pear-shaped, with a double row of transverse teeth, and are pendent at the end of the stems.

Brzezany, tn., Galicia, Austria, 31 m. W.S.W. of Tarnopol. Pop. 11,000.

Brzeziny, tn., Russian Poland, Piotrkov gov., 14 m. E. of Lodz; has woollen manufactures. Pop. 8,000.

B.Th.U., or **BRITISH THERMAL UNIT**, is the unit quantity of heat employed by engineers. It is the amount of heat required to raise the temperature of 1 lb. of water from 49° to 50° F., and is mechanically equal to 778 ft.-lbs. of work.

B.T.U. See **BOARD OF TRADE UNIT**.

Buache, PHILIPPE (1700-73), French geographer; born at Paris; became geographer-royal (1729), and a member of the Academy of Sciences (1730). His principal works are *Considérations Géographiques et Physiques sur les Nouvelles Découvertes au Nord de la Grande Mer* (1753), and *Atlas Physique* (1754). His nephew, **JEAN NICOLAS BUACHE DE LA NEUVILLE** (1741-1825), also a geographer, wrote *Géographie Élémentaire Ancienne et Moderne* (1769-72).

Bubalis. See **HARTEBEEST**.

Bubastis, in the Nile delta, Lower Egypt; once a famous city, but now a heap of ruins (Tell Basta), 40 m. N.N.E. of Cairo. The Pi-beseth of Ezekiel (30:17), it is described from personal knowledge by Herodotus (G. Rawlinson's ed., ii. 60, 137; 1875), under its Greek name of Bubastis. It had a magnificent temple to the goddess Ubasti, the Egyptian Artemis. It was captured by Mentor, the general of Artaxerxes III., and began to decay after the foundation of Alexandria. See Naville's accounts, 8th and 10th *Memoirs* of the Egypt Exploration Fund (1891-2).

Bubble, SOUTH SEA. See **SOUTH SEA BUBBLE**.

Bubo, an inflammatory swelling of a lymphatic gland in any part of the body. The term is usually confined to swelling of the glands of the groin. Buboos are divided into (1) *simple*, due to inflammation of a gland through ordinary irritation from an inflamed surface; (2) *specific*, an abscess inoculated with the pus of a chancre; and (3) the indolent

enlargement of the lymphatic glands which accompanies the development of the initial sore of syphilis. The treatment consists in rest in bed, hot fomentations, baths, opening freely, scraping and dressing with iodoform or other antiseptics. Should such treatment fail, the diseased glands must be excised.

Bubo. See **OWL**.

Bubonic Plague. See **PLAGUE**.

Bucaramanga, *tn.*, Colombia, near the Lebrija R., 180 m. N.N.E. of Bogotá. It is one of the three great coffee markets of Colombia, and has hat and cigar factories. Iron, copper, and gold are found in the region. Alt. 3,250. Pop. 25,000.

Buccaneers, or **FILIBUSTERS**, piratical adventurers of diverse nationalities who preyed upon Spanish trade and property in the W. Indies and on the neighbouring mainland in the 17th century. The buccaneers were originally cattle-hunters, who made San Domingo their headquarters; also Tortuga in 1630. San Domingo was full of wild cattle, and the buccaneers took their name from the grating or barbecue on which the flesh was roasted, which in the Indian language was called a *boucan*. The flesh was called *viande boucannée*, and the hunters *boucaniers*. Eight years later Spain destroyed this settlement; but the adventurers returned in force, and thenceforward, for about seventy years, were the terror of the Spaniards in that part of the world. The British conquest of Jamaica in 1655 gave the buccaneers a new headquarters. The leaders among the earlier buccaneers were Montbars, Olonnais (Frenchmen), Mansvelt, and Henry Morgan (a Welshman). New Segovia, in Honduras, was taken and sacked in 1654; Maracaibo and Gibraltar, on the Gulf of Venezuela,

were plundered; and Providence, in the Bahamas, was settled by the freebooters. Morgan distinguished himself especially by the capture and sack of Puerto Bello; but his successes, directed from Jamaica, induced Great Britain and Spain, in 1670, to conclude a treaty in virtue of which buccaneering was to be suppressed. Morgan and his friends revolted against this, and in 1671, with a fleet of thirty-nine vessels, crossed to the mainland, traversed the isthmus, and took and burnt the rich town of Panama, with circumstances of great cruelty and outrage. Morgan afterwards made terms with the British government, became deputy-governor of Jamaica, and died a knight. A second time the outlaws took Puerto Bello. In 1680 they again crossed the isthmus of Panama, took Santa Maria, and embarked on the Pacific under John Coxon. Defeating a Spanish squadron, various bands, under Sharp, Watling, and Sawkins, pushed south to the coasts of Peru and Chile, and returned by Cape Horn. In 1683 Van Horn, with six vessels and 1,200 men, took and plundered Vera Cruz. Another body of pirates, under John Cook, in 1683 went by Cape Horn, picked up at sea a vessel which had been sent out to them by English sympathizers under the command of one Eaton, and after Cook's death served under Edward Davis and Swan in the Pacific, pushing up to Panama, and being there joined in 1685 by more buccaneers, who had crossed the isthmus—one body under Grognet and L'Escuyer, and another under Townley and others. They won extraordinary successes, but fell out among themselves, the result being that the French and English deserted each other. Davis sacked Leon and Realejo (Ria Lexa), in Nicaragua, and returned by Cape Horn in 1688. Townley and Swan took different

courses. Some of the survivors afterwards co-operated with a French expedition against Cartagena. The buccaneers were further divided by the war which broke out between Great Britain and France in 1689, and in 1697 they were very roughly handled by a combined English and Dutch fleet outside Cartagena. After the treaty of Ryswick they were discountenanced by both England and France. From that time they gradually disappeared, although bands of pirates lingered on at Providence in the Bahamas. William Dampier, the navigator (later in the royal navy), served with Cook, Davis, and Swan. See PIRACY; also Exquemelin or Oexmelin, *De Ameri-caensche Zee Roovers* (1678; Eng. trans., *Hist. of the Bucaniers of America*, 1741); Water, *Voyage and Description of the Isthmus of America* (1699); Archenholz, *Hist. of the Pirates, Freebooters, or Buccaneers of America* (trans. 1807); Capt. Chas. Johnson, *Hist. of Highwaymen and Pirates* (2nd ed. 1734-42); Burney, *Hist. of the Buccaneers of America* (1816-1902); Pyle, *Buccaneers and Marooners of America* (1891); Dampier, *New Voyage Round the World* (1697; new ed. 1847); Stockton, *Buccaneers and Pirates of our Coasts* (1898); and Haring's *Buccaneers in the W. Indies in the 17th Century* (1910).

Buccinator (Lat. 'trumpeter'), the muscle forming the wall of the check.

Buccino, tn., prov. Salerno, Italy, 25 m. w. of Potenza. Pop. 6,000.

Buccinum. See WHEEL.

Buccleuch, old par. in Ettrick par., Selkirkshire, Scotland; gave title to the dukes of Buccleuch.

Buccleuch Family. The Border house of the Scotts of Buccleuch is traced back to Sir Richard le Scot, a man of distinction in the reign of Alex-

ander III. of Scotland. He died in 1320, and from him was lineally descended Sir David Scott of Branhholm, who sat in the Parliament held by James III. at Edinburgh in 1487, under the designation of 'Dominus de Buccleuch,' being the first of the family so designated. His grandson was Sir Walter Scott of Branhholm and Buccleuch, who figures in Sir Walter Scott's *Lay of the Last Minstrel*. The first 'Lord Scott of Buccleuch' was Sir Walter Scott, warden of the Western Marches, who is celebrated for his rescue of one of his attendants, 'Kinmont Will,' from the castle of Carlisle. He was elevated to the peerage in 1606 as Lord Scott of Buccleuch. He afterwards won distinction in the Netherlands under Maurice, Prince of Orange. The first Earl of Buccleuch was Walter Scott, who received the title in 1619. He had command of a regiment under the states of Holland against the Spaniards. His grand-daughter, Anne, Countess of Buccleuch, married, in 1663, the Duke of Monmouth, illegitimate son of Charles II. On their marriage they were created Duke and Duchess of Buccleuch. The duke's honours were forfeited on his execution in 1685, while those of the duchess in her own right remained unaffected by the attainder. Francis, her grandson, succeeded as second duke. Henry, the third duke, succeeded to the dukedom of Queensberry, the title from that time being Buccleuch and Queensberry. The present holder of the title is the sixth duke. One of the branches of the Buccleuch family was that of Harden, which produced the Scotts of Raeburn, ancestors of Sir Walter Scott. See Fraser's *The Scotts of Buccleuch* (1878).

Bucentaur, the name of the state galley of the republic of Venice, in which the doges an-

nually, from 1311 to 1789, on Ascension day, 'married the Adriatic,' in token of Venice's sovereignty of the seas. This custom is traced to a naval victory gained on Ascension day 1177 by Doge Sebastiano Liani over the emperor Frederick Barbarossa. The last *Bucentaur*, made in 1722-9, was burned by the French in 1798.

Bucephala, a city on the Hydaspes (the Jhelum), in N. India, founded by Alexander the Great in 326 B.C. in honour of his horse Bucephalus.

Bucephalus, favourite charger of Alexander the Great, which died on the banks of the Hydaspes in N. India in 326 B.C.

Bucer, or BUTZER, MARTIN (1491-1551), German reformer, was born in Lower Alsace. He entered the Dominican order at fifteen, but in 1518 was converted by Luther and by Erasmus's writings to the reformed faith. Quitting the order in 1521, he became court preacher to the Elector Palatine, and in 1523 pastor in Strassburg, which place he did much to make the centre of Protestant light and learning. During the controversy on the eucharist between Luther and Zwingli, in which the Strassburgers supported the latter, Bucer sought to promote agreement among the reformers; but being compelled to leave Strassburg because of his refusal to accept the Augsburg Interim (1549), he went, at Cranmer's invitation, to England, where he was appointed regius professor of divinity at Cambridge, and lectured there until his death. His *Correspondence* with the Landgrave Philip of Hesse was published by Lenz in 1880-91. See Erichson, *Martin Butzer* (1891); and Baum, *Capito und Butzer* (1860).

Buch, CHRISTIAN LEOPOLD VON, BARON VON GELMERSDORF (1774-1853), Prussian geologist,

born at the castle of Stolpe, in the Uckermark. He contributed largely to the development of geology, though his extreme view of the Vulcanian theory of the origin of the earth's crust is no longer tenable. In 1815 he accompanied the botanist Smith to the Canaries, and published *Physikalische Beschreibung der Kanarischen Inseln* (1825). Besides this he wrote *Beiträge zur Bestimmung der Gebirgsformationen in Russland* (1840); *Betrachtungen über die Verbreitung und die Grenzen der Kreidebildungen* (1849). He prepared a geognostic chart of Germany in 42 sheets (2nd ed. 1832), and wrote monographs on the *Terebratula* (1834), *Spirifers* (1838), *Leptæna* (1842), *Ceratites* (1849). A complete edition of his works appeared in 4 vols. (1867-85).

Buchan, dist. now included in Banffshire and Aberdeenshire, Scotland, N.E. corner between the rivers Deveron and Ythan. The district gives its title to one of the most ancient of Scottish earldoms, held by Comyns, Stewarts, and Erskines. The coast-line of 40 m. is mostly bold and rocky, especially at the Bulers ('boilers') of Buchan (6 m. S. of Peterhead), so called in reference to the 'boiling' of the cauldron-like 'pot' in its granite cliffs during storms. Formerly a haunt of smugglers, it has been the subject of pen pictures by Sir Walter Scott and Dr. Johnson. See *The Book of Buchan*, ed. by J. F. Tocher (1910); and Pratt's *Buchan* (new ed. 1901).

Buchan, ALEXANDER (1829-1907), Scottish meteorologist, became secretary to the Scottish Meteorological Society in 1860, and was for many years curator of the library and museum of the Royal Society of Edinburgh. Among his works are *Handy Book of Meteorology* (1867), *Introductory Text-book of Meteorology* (1871),

and *Atmospheric Circulation and Oceanic Circulation* ('*Challenger*' Reports for 1889 and 1895).

Buchan, DAVID (1780?-1837), British explorer. In 1818 he, with Franklin, received the command of two vessels, the *Dorothea* and the *Trent*, with the charge to find a way from the Atlantic to the Pacific Ocean. Unable to get beyond Spitzbergen, Buchan returned, and was appointed high sheriff of Newfoundland (1825). A few years later he sailed again into northern seas, but never returned.

Buchan, ELSPETH (1738-91), Scottish religious enthusiast, was the daughter of a Banffshire innkeeper. Having pretended to miraculous powers, she and her followers were expelled from Irvine, and established themselves near Closeburn, Dumfriesshire. According to Robert Burns, they held community of goods and of women. See Train's *The Buchanans from First to Last* (1846).

Buchan, PETER (1790-1854), ballad collector, born at Peterhead, Scotland. In 1819 he constructed a new press on an original plan, which was worked with the foot, and printed from wood, stone, and copper, as well as from ordinary type. Importance attaches only to his collection of *Ancient Ballads and Songs of the North of Scotland* (2 vols. 1828; new ed. 1845).

Buchan, WILLIAM (1729-1805), Scottish physician, a native of Ancrum, Roxburghshire, practised medicine at Ackworth (Yorkshire), Sheffield, Edinburgh (c. 1766), and after 1778 in London, where he was well known for his medical skill, convivial habits, and great benevolence. His chief work, *Domestic Medicine* (1769), the first English book of its kind, reached its twenty-first edition in 1813.

Buchanan (41,644 ac.), par., W. Stirlingshire, Scotland, 2 m. N.W. of Drymen station. Wild and barren tract of mountainous country;

only small portion under cultivation. Buchanan Castle is a fine seat of the Duke of Montrose. Pop. 500.

Buchanan, CLAUDIUS (1766-1815), acted as curate to John Newton, later (1797) as an Indian chaplain; and finally (1799-1808) was vice-provost of the Fort William College, founded at Calcutta by Wellesley. He undertook important tours through S. and W. India, investigating native religions, examining the Christian churches and libraries, and doing much to forward learning and the dissemination of the Scriptures. See *Life* by Pearson (1819).

Buchanan, GEORGE (1506-82), Scottish historian and scholar, born at Killearn. He was a kinsman of James VI.'s goldsmith, George Heriot (the 'Jingling Geordie' of *The Fortunes of Nigel*). From 1520-2 Buchanan studied 'the humanities' at the University of Paris. In 1526 he proceeded with John Mair or Major to Paris, where he entered at the Scottish College, and (1528) obtained the M.A. degree. For some years (from 1528) he held a professorship in the college of Sainte-Barbe, and in 1535 he returned to Scotland in the capacity of tutor to the young Earl of Cassillis (Gilbert, third earl, 1517-58), whose subsequent career was unquestionably influenced by the teaching of Buchanan. King James V. now engaged him as tutor to one of his natural sons, James Stewart, who later became abbot of Kelso. But the anger aroused among the higher clergy by his three powerful satires (*Somnium*, *Palinodia*, and *Franciscanus*), in which he held up to contempt the ignorance and depravity of the monks, led to his imprisonment, as a Lutheran, in the castle of St. Andrews; from which, however, he speedily made his escape, and sought refuge in England (1539), but soon crossed

to France, where he received the appointment of professor of Latin in the college of Bordeaux, one of his pupils being the young Montaigne. This position he held till 1542, when he accepted a professorship in Paris. In 1547, however, he was induced by his friend Gouvêa, principal of the new university of Coimbra, Portugal, to exchange his chair in Paris for a similar appointment at Coimbra, where Buchanan's brother Patrick was also a professor. But Buchanan's Lutheranism soon brought him into conflict with the Portuguese clerics, and he was made to undergo a period of confinement in a monastery. Thereafter he visited England, and later (1552) France, where he wrote his tragedy *Jephthes*, dedicating it to the Maréchal Comte de Brissac, who appointed Buchanan tutor to his son Timoléon de Cosse. After five years of this life he again returned to Scotland, and became successively classical tutor to the young Queen Mary, principal (1566) of St. Leonard's College, St. Andrews, and (1567) moderator of the General Assembly of the Reformed Church of Scotland, of which he had formally become a member about 1562. His sympathies were consequently all on the side of the Protestant lords in their revolt against Queen Mary; and his sentiments were displayed with much arrogance and vehemence in his *Detectio Mariæ Reginae* (1569).

On the assassination of the Regent Moray (1570), the queen being now a prisoner of her cousin Elizabeth, Buchanan was chosen as one of the preceptors of the boy-king, to whom he afterwards dedicated his *De Jure Regni apud Scotos* (1579), and who owed to this erudite instructor the scholarly attainments which distinguished him in after life. For a short time Buchanan was director of the chancery, and then (1570) for

some years keeper of the privy seal, an office which he resigned (1578) in favour of his nephew, Thomas Buchanan of Iboort, near his native Killearn. The closing event of his life was the publication (1582) of his famous *Rerum Scotticarum Historia*. His death took place at Edinburgh.

Buchanan's outstanding work is undoubtedly the History of Scotland; but the high scholarship which made him remarkable throughout Europe is eminently displayed in his Latin paraphrase of the Psalms of David, and his power as a debater and a reformer is manifest in the *De Jure Regni*. One distinguishing characteristic was a strong Rabelaisian humour. The only two editions of his works are those of Ruddiman (Edin. 1715) and Burman (1725).

Until 1890, Irving's *Life of Buchanan* (1817) was the modern authority; but it was then superseded by P. Hume Brown's more precise and critical work, *George Buchanan, Humanist and Reformer* (new ed. 1906). See also *George Buchanan: A Memorial, 1506-1906*, by various writers (1907).

Buchanan, JAMES (1791-1868), president of the United States, was born near Mercersburg, Pennsylvania. He was called to the bar, in 1812. In 1820 he was elected a member of Congress, and in 1831 became minister to Russia, with which country he concluded a commercial treaty very advantageous to the United States. He returned home in 1833. Elected a senator in December 1834, he favoured the annexation of Texas by the United States. Political parties having been greatly disturbed, Buchanan threw in his lot with the Democratic party, and from 1845 to 1849 he was secretary of state to President Polk. In 1853 he was appointed minister of the United States in London; and in 1856 he was elected president

of the United States. Although his principles would not have allowed him to become individually a slaveholder, he strongly supported the maintenance of slavery as an existing institution. After Lincoln's election to the presidency in 1860, he retired from public life. See *Mr. Buchanan's Administration on the Eve of the Rebellion*, written by himself (1866); Greeley's *American Conflict* (1864); and *Life of Buchanan*, by G. Ticknor Curtis (2 vols. 1883). A collected edition of his works, by J. B. Moore, appeared in 1908.

Buchanan, ROBERT WILLIAMS (1841-1901), poet, novelist, and dramatist, was born in Warwickshire, of Scottish parents. His first volume of poems, *Under-tones*, appeared in 1860; but he rose to a much higher level in his *London Poems* (1866). The life of the poor of London is here vividly, humorously, and pathetically described. Among his subsequent poetical works are *The Book of Orm* (1870), *Balder the Beautiful* (1877), *The City of Dreams* (1888), and *The Wandering Jew: a Christmas Carol* (1893). His miscellaneous works include *The Land of Lorne* (1871), *David Gray* (1868), and *The Hebridean Isles* (1882). He had much success as a novelist—e.g. *The Shadow of the Sword* (1876), *God and the Man* (1881), *The New Abclard* (1884), *The Heir of Linne* (1888), *Rachel Dene* (1894), and *The New Rome* (1899). In conjunction with H. Murray, he also wrote *The Charlatan* (1895). As a playwright he had several distinct successes—*Lady Clare*, *Sophia*, and *Joseph's Sweetheart*—intertwined with many failures. Buchanan was at war with the critics nearly all through his literary career. His attack on Rossetti and other poets in his pamphlet, *The Fleishly School of Poetry*, provoked a famous rejoinder from Swinburne.

Buchanites. See BUCHAN, ELSPETH.

Buchan Ness, or BODDAM POINT, rocky peninsula, 3 m. s. of Peterhead, Aberdeenshire, Scotland; most easterly point in Scotland.

Bucharest, or BUKHAREST (Roum. *Bucuresti*), tn. and cap. of Roumania, situated on both banks of the river Dimbovitza, in the midst of a fertile plain, 30 m. N. of the Danube. It is surrounded by modern fortifications, constructed after the plans of the Belgian general Brialmont. Bucharest was much improved during the last two decades of the 19th century, and is now a very handsome city. It is the seat of the Roumanian Greek-Orthodox primate and of a Roman Catholic bishop. Among the principal streets, besides the boulevards, are the Strada Lipsceani, the commercial quarter, on which stands the National Bank, one of the finest buildings in the city; and the Calea Victoriei, where are situated the Royal Palace, the National Theatre, Post Office, etc. Among other noteworthy edifices are the Athenæum (built 1887), art exhibition, library, university, and the law courts (1897). Bucharest has several public gardens—e.g. the Cismegiu, in the middle of the city; and the Shoseaua Kisselef, in the neighbourhood, a sort of Champs Elysées. Among the churches are the cathedral (1656), on a commanding site above the city; the Domnita Balasa, in the Byzantine style, lavishly decorated; St. Spiridon (rebuilt in 1890); the chapel Stravropolos, small, but a gem of Byzantine art. Bucharest possesses a university (founded in 1864), with 4,144 students in the different faculties in 1903-4; two Greek-Orthodox seminaries; an academy of arts, and a conservatory of music; and is the seat of the Roumanian Academy

of Sciences. It is also the centre of the railway system of the country. Manufacturing industry is yet in its infancy, but the commerce is very active, Bucharest being the distributing centre for the whole of Roumania as well as for some parts of the Balkan Peninsula. The climate is extreme, with very hot summers and very cold winters, the latter owing to the winds from the north. Pop. 300,000. From the 15th century until 1698 it was the winter residence of the princes of Walachia. It was devastated by plague on several occasions, especially in 1794 and 1812, when over 50,000 persons perished; by severe earthquake in 1802; by fire in 1847. In 1859, on the union of the provinces of Walachia and Moldavia, it became the capital of the country. Here were concluded the treaty of 1812, between the Turks and the Russians; and the treaty of 1886, between the Servians and the Bulgarians.

Buchau, tn., Württemberg, Germany, 32 m. s.w. of Ulm, with cotton mills. It was formerly famous for its imperial abbey (of nuns), founded in the 8th century. Pop. 2,400.

Bucher, LOTHAR (1817-92), German politician, was born at Neu-Stettin. In 1848 he was elected to the National Assembly, and became a democratic leader. With others he was condemned to imprisonment for refusing to pay taxes, but escaped to England, where he acted as correspondent to the *National Zeitung*. In 1860 he returned to Germany, and became Lassalle's literary executor. Bismarck made him his private secretary. He was responsible for the constitution of the N. German Confederation, and was intermediary in the Hohenzollern overtures for the Spanish crown. He was strongly anti-British in sentiment. See Busche's *Bismarck*;

: *Secret Pages of his History* (1898); and Bucher's *Leben und Werke* (1890).

Buchez, PHILIPPE BENJAMIN JOSEPH (1796-1865), French philosopher and politician, was born at Matagne-la-Petite (now in Belgium). A thorough democrat, he took part in numerous conspiracies against the Bourbons, and was one of the founders of the French Carbonari Society, which made several attempts at revolution. About 1825 he attached himself to the St. Simonian Society, but left it in 1829, and shortly afterwards founded a Neo-Catholic school, and, to expound the doctrines of Buchezism, published a periodical, *L'Européen* (1831-48). Expositions of his theory of the progress and development of the human race are contained in *L'Introduction à la Science de l'Histoire* (1833), *Essai d'un Traité Complet de Philosophie au Point de Vue du Catholicisme et du Progrès* (1839-40), and *Traité de Politique et de Science Sociale* (1866). In conjunction with Roux Lavergne he published *L'Histoire Parlementaire de la Révolution Française* (40 vols. 1834-8)—one of the chief sources of information regarding the French revolution. At the revolution of 1848 he was made president of the Constituent Assembly.

Buchholz, tn., Saxony, Germany, on riv. Selma, 18 m. s. by E. of Chemnitz; is largely engaged in the manufacture of lace (an industry dating from the 16th century), and has many bookbinding establishments. Pop. 9,500.

Büchner, FRIEDRICH KARL CHRISTIAN LUDWIG (1824-99), German physician and naturalistic philosopher, was born at Darmstadt, and qualified for the medical profession. While he was lecturer in the university at Tübingen he brought out *Kraft und Stoff* (1855; 20th ed. 1902; Eng. trans. 1870), which aroused

violent controversy. His later writings were devoted to the popularization of Darwinism and similar theories. Of these works may be mentioned *Die Darwinische Theorie* (5th ed. 1890); *Der Mensch und seine Stellung in der Natur* (1870; 3rd ed. 1889), trans. into Eng. under the title *Man in the Past, Present, and Future* (1872); *Der Fortschritt in Natur und Geschichte im Licht der Darwinischen Theorie* (1884); *Das Goldene Zeitalter oder das Leben vor der Geschichte* (2nd ed. 1891); *Die Macht der Vererbung* (1882); *Licht und Leben* (1881); *Das künftige Leben und die moderne Wissenschaft* (2nd ed. 1889). He translated into German Lyell's *Antiquity of Man* (2nd ed. 1873). See his biography in *Last Words on Materialism* (Ger. 1901), by his brother, A. Büchner.

Bucine, tn., Italy, 25 m. S.E. of Florence. Pop. 8,000.

Buck, LEFFERB (1837-1900), American engineer, born at Canton, New York. He was a noted bridge builder, constructing many in the U.S.A. and S. America. His rebuilding of the Suspension bridge at Niagara Falls was his greatest achievement.

Buck-bean. See ROG BEAN.

Bückeberg, cap. of the principality of Schaumburg-Lippe, Germany, 6 m. E.S.E. of Minden. From 1770 to 1776 Herder was court preacher here. Pop. 5,700.

Bucket-shop. See STOCK EXCHANGE.

Buckhaven, fishing tn., Fifeshire, Scotland, on the Firth of Forth, 1 m. S.W. of Methil. Manufactures cordage and nets, and has coal mines in neighbourhood. Pop. 8,000.

Buckhound, a breed of dog formerly very common in England, but comparatively rare now. It used to be exclusively employed for buck-hunting, and closely resembles the staghound. Until 1897 a royal pack was maintained.

In 1901, on the recommendation of a select committee to consider the provision to be made for the crown, the mastership of the buckhounds and the royal hunt were abolished.

Buckie, *quoad sacra* par. and fishing tn., in par. of Rathven, N. Banffshire, Scotland, 7 m. N.E. of Fochabers, with stations on the G.N.S.R. and H.R. It has two harbours. It is a fishing centre for the district between Findhorn and Banff, and has rope, net, and sail factories, and a distillery. Pop. 7,500.

Buckingham, munic. bor., mrkt. tn., and par., Buckinghamshire, England, on the Ouse and a branch of Grand Junction Canal, station on Bletchley and Banbury line (L. & N.W.R.), 17 m. N.W. of Aylesbury. The town comprises three districts—the Borough, Bourton Hold, and Prebend End. The industrial products include malt, flour, condensed milk, and artificial manure. The grounds and mansion of Stowe lie 3 m. to the N.W., where the famous gardens were first laid out by Richard Temple, Lord Cobham. Pop. 3,000.

Buckingham, tn., Labelle co., Quebec, Canada, on the Rivière du Lièvre, 20 m. N.E. of Ottawa. Pop. 3,000.

Buckingham, GEORGE VILLIERS, FIRST DUKE OF (1592-1628), was the second son of a Leicestershire knight, Sir George Villiers. His handsome person and engaging manners early won for him court favour and rapid promotion. In the course of two years (1616-18), after the fall of Carr, Earl of Somerset, he was knighted, and was created successively Viscount Villiers, Baron Waddon, Earl of Buckingham, and Marquis of Buckingham. In 1620 he married the daughter of the Earl of Rutland, the richest heiress in the kingdom. During the negotiations for a treaty of marriage

between Prince Charles and the Spanish Infanta, Buckingham accompanied the prince on his fruitless mission to Spain; and he continued to maintain his ascendancy after Charles's accession to the throne in 1625. But those events which culminated in the failure of the expedition against Cadiz greatly diminished Buckingham's popularity. On two occasions Parliament attempted his impeachment, but each time this measure was thwarted by the dissolution of Parliament by the king. In 1627 Buckingham commanded a fleet sent to relieve La Rochelle; but he was unsuccessful, and returned in disgrace to England. Next year he planned a second expedition against La Rochelle, and went down to Portsmouth to embark. On August 23 he was stabbed to the heart by a disappointed officer named John Felton. Buckingham's character has been well portrayed by Scott in *The Fortunes of Nigel*; also by Dumas in the *Vicomte de Bragelonne*. See S. R. Gardiner's *Hist. of Eng., 1603-42*; Buckingham's *Memoirs* (1819); his *Life and Times*, by Mrs. A. T. Thomson (1860); and *Life*, by P. Gibbs (1908).

Buckingham, GEORGE VILLIERS, SECOND DUKE OF (1628-87), son of the preceding, was born at Westminster. On the outbreak of the civil war he served with the royal forces at the storming of Lichfield Close (1643). At the restoration he became one of the most influential men at court. The downfall in 1667 of the chancellor Clarendon made him paramount; and Pepys records that at this time the king had 'become a slave to the Duke of Buckingham.' Buckingham, however, became more and more deeply involved in political intrigues, notably with France, until at length, in 1674, the king definitely threw

him over in consequence of pressure from both houses of Parliament. At the accession of James II. his public career was practically at an end. He died the year before the English revolution, and was buried in Westminster Abbey. Buckingham was an accomplished courtier, and the author of certain satirical poems, political pamphlets, and a comedy entitled *The Rehearsal*, which held the stage for a long time, and probably inspired Sheridan's *Critic*. The latter was first printed in 1672; his *Miscellaneous Works* in 1705. Sir Walter Scott has portrayed Buckingham in *Peveril of the Peak*; and Butler in *Hudibras* has delineated him with merciless accuracy in 'A Duke of Bucks.' See *Life* by Winifred, Lady Burghelero (1903).

Buckingham and Chandos, RICHARD PLANTAGENET TEMPLE NUGENT BRYDGES CHANDOS GRENVILLE, SECOND DUKE OF (1797-1861), only child of the first duke, known as Marquis Chandos, author of the Chandos clause in the Reform Bill of 1832, by which the county franchise was fixed at £50; was M.P. for Buckinghamshire (1818-39). He was popularly called 'the farmer's friend,' and obtained a commission for the relief of agriculturists (1836). He took office under Peel, but opposed the repeal of the Corn Laws (1845-46). In 1839 he succeeded to the dukedom and £100,000 a year, but by lavish expenditure became bankrupt for over a million in eight years; and many of his estates, with the valuable library at Stowe, were sold. His interesting series of *Memoirs of the Courts and Cabinets* (from George III. to Victoria) were published in 1861, and his *Private Diary* in 1862.

Buckingham, JAMES SILK (1786-1855), English journalist, was born at Flushing, near Falmouth. At first a seaman, he later founded and edited the *Calcutta*

Journal (1818), which was suppressed for its criticism of the government; the *Oriental Herald and Colonial Review* (1824), which was designed to spread information regarding India; and finally the *Athenæum* (1828). See his *Autobiography* (1855).

Buckingham Canal, salt-water canal connecting Madras with the Godavari, British India.

Buckinghamshire, or BUCKS, inland county, England, bounded on the N. by Northamptonshire, on the W. by Oxfordshire, on the E. by Middlesex, Hertfordshire, and Bedfordshire, and on the S. by the Thames. Its greatest length is 53 m.; its extreme breadth, 27 m. The surface is on the whole undulating, and the highest part is the chalk range of the Chiltern Hills (900 ft.), near Wendover. The soil is fertile, especially in the centre and the south. The vale of Aylesbury is one of the most productive districts in the county, and is noted for its dairy produce; its sheep are famed for the weight and the length of their wool. The Chilterns are well wooded, especially with beeches. The chief rivers of the county are the Thames and its tributaries the Colne and the Thame; the N. part is in the Ouse watershed. The Grand Junction Canal, the G.W.R., and N.W.R. are the means of communication. The county town is Buckingham, but the chief commercial centre is Aylesbury. The principal industries are agriculture (wheat being the most important crop), straw-plaiting, lace-making, paper-making, and turnery at High Wycombe. There are three parliamentary divisions—Aylesbury, Buckingham, and Wycombe. Eton school is situated in the county. Area, 636 sq. m. Pop. 185,000. See Lipscomb's *Buckinghamshire* (4 vols. 1847); Gibb's *Buckingham* (1878-82); and Clement Shorter's *Buckinghamshire* (1910).

Buckland, FRANCIS TREVELYAN (1826-80), English naturalist, was born at Oxford. After studying medicine for five years at St. George's Hospital, London, he was house surgeon there from 1852-3; then assistant surgeon to the 2nd Life Guards from 1854-63, during which time he devoted himself to the study of zoology, and published *Curiosities of Nat. Hist.* (1857-72). He was a constant contributor to the *Field* from its establishment in 1856 till 1865, and founded *Land and Water* in 1866. He was the highest authority of his day on pisciculture, especially on the artificial rearing of salmon; and in 1865 he promoted an exhibition of fisheries at South Kensington. Buckland was inspector of salmon fisheries (1867), and special commissioner on the salmon fisheries in Scotland (1870). His other works are *Fish-hatching* (1863), *Nat. Hist. of British Fishes* (1881), and *Notes and Jottings from Animal Life*, published posthumously (1882). See *Life* by Bompas (1885); and in Walpole's *Essays Political and Biographical* (1908).

Buckland, WILLIAM (1784-1856), English geologist, a native of Tiverton, succeeded Dr. Kidd as professor of mineralogy at Oxford in 1813, and in 1818 was presented to the readership in geology. About this time he began his geological collection, now at Oxford. In 1825 he was presented to the living of Stoke Charity, and in 1845 became dean of Westminster. He received the Coploy medal of the Royal Society in 1822 for his account of the remains in Kirkdale Cave, which he more fully described in his *Reliquiæ Diluvianæ* (1823). Other important works are one of the Bridgewater Treatises, *Geology and Mineralogy Considered with Reference to Natural Theology* (1836), and *A Description of the S.-W. Coal-field of England* (1825).

Buckle, a device for fastening, consisting of a metal frame having one or more movable tongues, teeth, or catches. Buckles became generally worn in England, in place of shoe-strings, during the reign of Charles II. They were then made of very expensive materials. Buckles for shoes are mentioned much earlier than this, and were forbidden to be imported by an act of 1483. Others of an elaborate kind were used for sword-belts. The fashion of wearing shoe-buckles reached its height in the reign of George II.

Buckle, HENRY THOMAS (1821-62), English historian and sociologist, was born at Lee, in Kent. He was educated at home, being a delicate boy. The death of his father having placed him in command of a fortune of £1,500 a year, he turned to the acquisition of learning, with one great end in view. This was no less than to write a 'history of civilization;' and in order to equip himself for the work, he spent the next ten years in foreign travel, in the study of races and institutions, in learning languages, and in forming a library. In 1857 the first volume of his *History of Civilization* appeared, and its author suddenly achieved fame. The second volume was published in 1861, but all further progress was arrested by the death of the author at Damascus in the following year. It appears that he had projected a huge work, of which these two volumes formed but the introduction. Buckle's *History of Civilization* is an attempt to give a scientific basis to history, by demonstrating the effect of natural conditions upon the progress of any race. He regards social progress as intellectual and not moral—a point of view which has been wholly superseded. See *Life* by Huth (1880), and *Works*, ed. by Miss Taylor (1872); Grant Allen (1880);

and *Buckle and his Critics*, by J. M. Robertson (1895).

Buckle, GEORGE EARLE (1854), born at Twerton-on-Avon, near Bath, was called to the bar at Lincoln's Inn in 1880, joining in the same year the editorial staff of the *Times*, of which he was appointed editor on the death of Thomas Chenerly in 1884.

Bucklersbury, a dist. of London, originally spelt *Bokerels-burt*, takes its name from the opulent family of Bokerels or Bukerels, who dwelt there in the 13th century. Bucklersbury formerly extended from the east end of Cheapside to Charlotte Row, on the west side of the Mansion House; but it was cut in half and greatly shortened by the formation of Queen Victoria Street.

Buckley, ARABELLA BURTON—MRS. FISHER (1840), English naturalist, was born at Brighton. She has written many popular works on natural history, specially adapted for the young, including *A Short Hist. of Nat. Science* (1876; 5th ed. 1894), *Life and her Children* (1880; new ed. 1882), *Winners in Life's Race* (1882; new ed. 1888), *Moral Teachings of Science* (1891), *Eyes and no Eyes* (1901).

Bucknall Steamship Lines, Limited. This company was formed in 1900 to take over and extend the British and Colonial Line (from London to S. and E. African ports), established in 1892, for passengers and cargo; also lines between New York and S. Africa, New York and Australia and New Zealand, New York and Manchuria and Far East ports, New York and India. London and other English ports to ports on the Red Sea and Persian Gulf ports *via* Marseilles. Fleet—29 steamers (123,463 tons). London office: 23 Leadenhall Street, E.C.

Buckner, SIMON BOLIVAR (1823), American soldier, was born in Kentucky. He was a professor

(1845-6, 1848-50) at the military academy at West Point, and distinguished himself under Scott in the Mexican war. On the outbreak of the civil war he invaded Hart County in the Southern interest in 1861; but at Fort Donelson, in 1862, he surrendered with 15,000 men to General Grant. He was exchanged as a prisoner, and fought again at Murfreesboro and Chickamauga. He became governor of Kentucky, and in 1896 was the gold Democrats' candidate for the vice-presidency of the United States.

Bucknill, SIR JOHN CHARLES (1817-97), English physician, studied medicine at University College, London. He began practice in Chelsea, but owing to ill-health removed to Exminster, to take charge of the Devon County Asylum (1844-62). He was elected fellow of University College, London (1850), and was the lord chancellor's medical visitor of lunatics from 1862 to 1876. He was knighted in 1894. Bucknill was the highest authority of his time on insanity; he wrote *Unsoundness of Mind in Relation to Criminal Acts* (1854), *The Psychology of Shakespeare* (1867), *Habitual Drunkenness and Insane Drunkards* (1878), *A Manual of Psychological Medicine* (4th ed. 1879), etc. He edited the *Journal of Mental Science* (1855-62), and helped to found *Brain*, *A Journal of Neurology* (1878).

Buckskin, a very soft leather, prepared from the skin of a buck or sheep; used for gloves, and formerly by the American Indians for clothing. Also a strong twilled cloth with shorn pile, carefully finished, used for breeches.

Buckstone, JOHN BALDWIN (1802-79), English actor and dramatist, was born at Hoxton, London. He was articled to a solicitor, but in 1820 abandoned law for the stage, and played at Peckham in

melodrama. In 1823 he appeared in London in the Surrey Theatre as Ramsay in *The Fortunes of Nigel*, and in 1827 joined D. Terry's company at the Adelphi, where he produced some of his best-known dramas. In 1833 he removed to the Haymarket, where he was manager from 1853 to 1876. His most famous rôles were Tony Lumpkin, Bob Acres, Sir Benjamin Backbite, and Scrub. Buckstone was noted for his humour and pathos, and for his droll interpretation of comic characters. He wrote over a hundred dramas, the most popular being *Green Bushes*, *Flowers of the Forest*, and *Popping the Question*.

Buckthorn. The common buckthorn, waythorn, or harts-horn (*Rhamnus catharticus*) is fairly abundant in hedges and woods over the greater part of Britain. It is a spreading shrub, about ten feet in height, and is characterized by a smooth bark, branches terminating in thorns, small unisexual four-petaled green flowers, occurring between the serrated leaves in May, and four-seeded black berries about the size of currants. The juice of the berries is sometimes used in medicine, as the specific name of the plant indicates. From the juice is prepared the colour known as sap green. The alder buckthorn (*R. frangula*) is also a native of Britain. Its habit is more tree-like than spreading, its leaves are entire, its flowers five-petaled, and its berries two-seeded. Another species (*R. palinurus*), not British, is one of the plants which were fabled to have been used in making Christ's crown of thorns.

Buckwheat (*Fagopyrum esculentum*) is a member of the natural order Polygonaceæ, to which belong also the dock, sorrel, and rhubarb. It is an annual plant, growing to a height of three feet, and is extensively cultivated in America and Europe, and to a

small extent in England. Its fruit is used as human food, but in England it is chiefly grown as a poultry food. The flower, which is pink, is much liked by bees. Buckwheat may be grown on soil too poor and sandy for any of the ordinary cereals to be profitably sown. Not being quite hardy, it should not be sown until the end of May. The seed should be sown in drills, eighteen inches from row to row, at the rate of a bushel per acre. It is harvested about the end of August, a fair crop being thirty to fifty bushels per acre.

Buczacz, tn., Galicia, Austria, 35 m. S.S.W. of Tarnopol. Pop. 12,000.

Bud. A bud is an unexpanded branch—stem, leaves, and sometimes flowers being all present in a miniature and undeveloped form. This branch is formed in advance, so that, when spring and sunshine arrive, no time may be lost in pushing ahead and effecting growth before winter again arrives and checks activity. In some cases, by the efforts of art or nature, the bud, while growing in size, never really develops. We see this in the cabbage head, which is nothing but a large bud. As buds have often to live through severe weather, with excessive cold and wet, their parts are packed tightly together, so that the minimum of surface may meet the outer world; and they are usually covered by certain scales, which are modified leaf-bases, stipules, or leaves. The buds of evergreens have usually no protecting scales. Often additional protection is afforded to the buds by means of hairs or resin; and many plants which die down every year have their buds waiting beneath the earth's surface until the sun's warmth tempts them to push forth and develop into the stems, leaves, and flowers that they really are. Buds usually arise in the axils of leaves, though

circumstances may cause them to form elsewhere. The so-called fruit-buds of apple and pear trees may usually be distinguished from those buds which will yield stems and leaves only, by their greater size, and by their being commonly situated at the end of a stem or spur. See Lord Avebury's *Flowers, Fruits, and Leaves* (1873), and *Buds and Stipules* (1872).

Budæus, or **BUDÉ**, GUILLAUME (1467-1540), French philologist, was born at Paris. After a somewhat reckless youth, he became one of the most profound Greek scholars of his day. He was highly esteemed by Francis I. His most remarkable works are *De Asse* (1514), a treatise on ancient Greek and Latin coins, measures, etc.; and *Commentarii Lingue Græcæ* (1529; improved ed. 1548). His collected works were published at Basel (1557). See *Lives* by Robitté (1846) and Eugène de Budé (1884).

Budaörs, vil. and summer resort, Hungary, 5 m. s.w. of Budapest. Pop. 6,000.

Budapest (anc. *Aquincum*), cap. of Hungary, a twin city on both banks of the Danube, on the edge of the great Hungarian plain, 163 m. by rail e.s.e. of Vienna. It was formed in 1873 by the union of Buda, on the w. bank, and Pest, on the e. bank, together with two suburbs, Ó Buda (Alt-Ofen) and Kőbánya. The centre of Pest is the quarter Belvaros, beside the Danube, enclosed within a boulevard which has replaced the old city walls. From this boulevard the streets radiate s.e., e., n.e., and n., the finest being the Andrássy Street, the Kerepesi, and the Üllői. Along the Danube the Francis Joseph quay stretches 1½ m. between the Francis Joseph bridge and the Margaret bridge. Near the n. end of the quay are imposing houses of parliament built in 1903, and near

them are the Curia Regia and the law courts. Towards the middle are the Academy of Sciences, the Bourse, and the 'Rodout.' On or near Museum Street stand the National Museum, National Theatre, and University (over 6,000 students). On Üllői Street are the Industrial Art Museum, hospitals, botanical gardens, and, in the Örczy Gardens, the royal military academy. The Leopold basilica stands near the s.w. end of Andrássy Street. On the outskirts of the city, to the s., is the cemetery, with memorials of Count L. Batthyány, Deák, and Kossuth. One of the most notable structures in Buda is the royal castle, crowning a hill some 230 ft. above the river. To the s.e. is the Blocksberg (400 ft.), crowned by the old citadel. A new quarter is growing up on the south side of Blocksberg. Buda possesses numerous hot sulphur springs, one of them on Margaret Island, in the river. The bath-houses are among the most perfect of the kind in Europe; the Caesar springs were used by the Romans. Industrially and commercially Budapest is the principal city in Hungary. The chief industries include engineering, flour-milling, carriage-building, printing, shipbuilding, brewing, distilling, the manufacture of tobacco, glass, chemicals, fancy and leather goods. Pop. about 835,000.

Buda, or Ofen, originated in the Roman military colony of Aquincum, and was the capital of Lower Pannonia. Destroyed by the Mongols in 1241, it was rebuilt by Bela IV., and from 1351 to its conquest by the Turks in 1526 it was the residence of the kings of Hungary. While in Turkish hands, from 1526-1686, it was six times besieged by the imperialist forces, who took it in the latter year. The Hungarians stormed it in 1849. Pest existed from Roman

times, but was not of much consequence till the 18th century. In 1867 it was made the capital of Hungary. From the 10th to the 14th century the Hungarian national assemblies used to meet in the open air on the Rikos plain, east of the city. See Szalay and Kahn's *Die Ungarische Metropole* (1889), and Hevest's *Budapest und Seine Umgebungen* (1873).

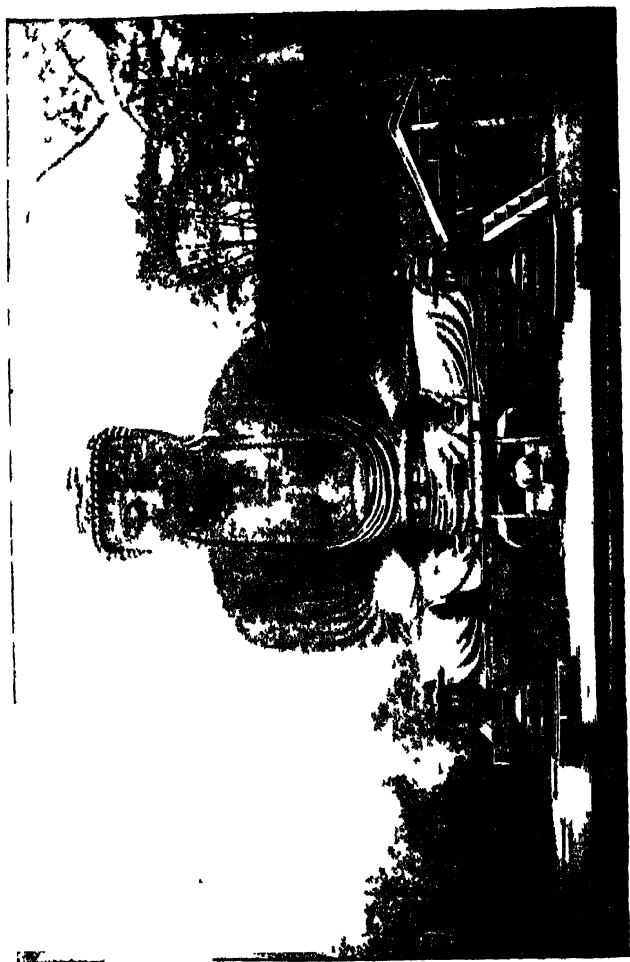
Budaun, or BUDAON, tn., United Provs., India, 125 m. S.E. of Delhi. Founded, according to tradition, by Budh, an Ahar prince, about 905 A.D., it was a centre of disturbance during the mutiny of 1857. Pop. 40,000.

Budd, GEORGE (1808-82), English physician, born at North Tawton, Devonshire; was appointed professor of medicine (1840), and, on his retirement, honorary fellow of King's College, Cambridge (1863). In 1837, owing to ill-health, he gave up his large practice, and retired to Barnstaple. His writings include *Disorders of the Liver* (1845), *Diseases of the Stomach* (1855), a *Report on Cholera in the 'Dreadnought' Hospital Ship, 1837*, and numerous important papers in medical journals.

Budd, WILLIAM (1811-80), English physician, younger brother of the preceding, was born in Devonshire, and settled at Bristol (1842). As a specialist on epidemic diseases he did much to promote better modes of sanitation. His principal work is *Typhoid Fever: its Nature, Mode of Spreading, and Prevention* (1873). He also published *Malignant Cholera* (1849), *The Siberian Cattle Plague* (1865), *Scarlet Fever and its Prevention* (1871), and *Cholera and Disinfection* (1871).

Buddha, 'The Enlightened One,' was the founder of Buddhism. His father, Suddhodana, was the chief of a small Aryan tribe named the Sakyas, whose capital, Kapila-vastu, was situ-

ated about 100 m. N.E. of Benares. As a child he received the name of Gautama. He is also known as Siddhartha and as Sakyamuni, and lived from about 560 to 480 B.C. Miraculous circumstances are alleged to have attended the conception and birth of Gautama, and many legends are preserved of the wisdom and prowess which marked his childhood and youth. It was not until his twenty-ninth year that Gautama saw the visions which led him to devote himself to the study of religion and philosophy. Paternal promptings which followed the birth of a son threatening to interfere with the divine call, Gautama, in a pathetic parting from his sleeping wife and babe, completed his great act of renunciation—leaving family and friends, wealth and power, to become a penniless and despised student and homeless wanderer. It is impossible, within the scope of this article, to follow Gautama in his wanderings and in his efforts to 'acquire merit.' Repeatedly tempted to return to the comforts of his home, assailed by doubts as to the reality of that virtue for which he had sacrificed so much, deserted by his followers, overwhelmed by the bitterness of failure, it was long ere, brooding in silent solitude under the bo-tree (tree of wisdom), there dawned the divine light which enabled him triumphantly to exclaim, 'I know it all.' Henceforth he was the Buddha. His wife became one of the first of Buddhist nuns. His son and his half-brother joined the order of pious mendicants which he established. His mission was the reformation of Hinduism. In withstanding the corruption and sensuality of his age, his broad philanthropy opened a heaven to the meanest outcast; and although he was thus placed in an attitude of passive antagonism to the distinctions of caste, he con-



Colossal Statue of Buddha at Kiriya, Japan

tinued a devout Hindu. In spite of the inherent weakness of the creed he promulgated—its end contemplation, inertia, Nirvāna—there is much that is fascinating in Buddha's devotion to duty, and in the example of a lifelong sacrifice which sought no selfish or sordid end. For a poetic rendering of Buddha's life and work, see Edwin Arnold's *Light of Asia* (1900); and see also K. E. Neumann's *Buddha* (1904) and Oldenburg's *Buddha* (Eng. trans., 4th ed., 1904).

Buddh Gaya, or BODH GAYA, vil., Behar div., Bengal, India, 70 m. s. of Patna. It is said to have been the dwelling-place of the founder of Buddhism, and has interesting Buddhist remains, including the palace of Asoka, the great Buddhist emperor.

Buddhism. About five centuries before Christ a Hindu ascetic, born in what is now Nepal, evolved a new 'way' of salvation. This prophet was the Buddha, and the faith which he promulgated was Buddhism. In its inception Buddhism was a reformation. Brahmanism had run to seed in the indecent worship and corrupt ritual of Hinduism; the arrogance of the priesthood and the injustice of caste were crying evils when Buddha preached his broad philanthropy. Making no attempt to solve the problem of the origin of things, he proclaimed the equality and brotherhood of man, and that the great end and object of existence was to attain non-existence (*Nirvāna*) by self-sacrifice, contemplation, and suppression of all passion. Subtly mingled with this inertia was the doctrine of *Karma*—a subject which has given rise to much speculation and controversy—a mysterious dogma of which it is not easy to give any concise and popular definition. Buddhism recognizes no soul, and therefore no future corporeal existence; but

each human act, right or wrong, each thought, pure or impure, is not only irrevocable but irredeemable. After death these actions (or results of actions) and thoughts (or their results), good or evil, have an inexplicable existence, until in due time they meet with their reward or punishment. Thus *karma* leads to the transmigration of Buddhism—far removed from the psychological transmigration taught by Hinduism—and is the mainspring of Buddhist activity. Innumerable 'precepts' and 'paths' of duty and of holiness point the 'way' by which each human being is to work out his salvation. By temperance, chastity, kindness, brotherly love, the body and the senses are brought under subjection, until being is absorbed in blissful *Nirvāna*. The life of an insect is as precious as that of a man; therefore to kill the humblest creature is accounted murder. Theft, deception, insobriety are denounced. Marriage is discouraged, but incontinence and unchastity are condemned. The encouragement of celibacy led to the formation of monastic orders, male and female. These monks and nuns were addressed by the Buddha as 'mendicants.' In time the monasteries became the repositories of learning, and thus gradually, almost imperceptibly, the priestly supremacy and arrogance which Buddha exerted himself to overthrow were once more re-established.

The Buddha wrote nothing. It was at least one hundred and thirty years after his death, when the Emperor Asoka—the Constantine of Buddhism—assembled a council of monks, that the first attempt was made to reduce the philosophy of Buddhism to writing. Subsequent councils sought to amplify its doctrines and to explain difficulties, but each attempt to reduce to dogma the precepts of the great teacher raised

fresh doubts and further objections. Astute Brahmans, quick to mark evidences of decay in the voice of dissent, at once adopted Buddha as an incarnation of Vishnu, and by concessions and adaptations enticed dissenters back into the fold of Hinduism. Thus was Buddhism driven from its birthplace, and at the present day it exists in India only under the form of Jain worship. There are many passages of remarkable and poetic beauty in the Buddhist scriptures, but the apparent hopelessness of the creed makes small appeal to the more sanguine and robust Western mind. This 'knowledge of the way'—a religion without theology, without deity, and with no gorgeous ritual—was spread by mendicant missionaries, northwards over Nepal and Tibet, eastwards through Burma and China to far-away Japan, and over Ceylon in the south. In our day it is the acknowledged faith of probably five hundred millions of people. In its diffusion it has lost some of its characteristics, and it has been absorbed in other and even antagonistic faiths. The Lamaism of isolated Tibet is far removed from the religion of progressive Japan; deep gulfs separate the Burman, the Chinaman, and the Sinhalese; yet all reverence the benign Buddha. See T. W. Rhys Davids's *Buddhism* (1877; new ed. 1903), in which all the leading authorities are given; Grünwedel's *Mythologie des Buddhismus in Tibet und der Mongolei* (1901); Oldenberg's *Buddha, sein Leben, seine Lehre und seine Gemeinde* (3rd ed. 1898); and *Buddhist India*, by Rhys Davids (1903).

Budding. The process of budding consists in taking from the tree which it is desired to propagate a piece of the bark with bud attached, and inserting it beneath the bark and against the wood of

the tree which is to serve as parent or stock. The process is chiefly employed in the propagation of roses, but it is also much used for propagating plums, pears, and apples, and occasionally for multiplying choice varieties of maples and other ornamental trees. June, July, and August are the months usually chosen for performing the operation, and it is very desirable that the bark should slip readily from the subjacent wood. Where possible, the stock for fruit-tree buds should be not less than an inch in circumference, and the bud should be inserted a very few inches above the ground-level, the leaves of the stock being rubbed off for two inches on either side just previous to the operation. Everything being in readiness, a vertical incision one inch long is made with a sharp budding-knife just through the bark of the stock, and a horizontal incision of half an inch across its highest point—the two cuts forming a T. A well-ripened shoot of the current season's growth is next cut from the variety which it is desired to increase, and its leaves cut off, leaving a small piece of each leaf-stalk attached to the stem. The best buds are situated at the lower and older part of the stem. By a careful use of the knife, the bud, together with half an inch of bark above and below, is cut out. Should there be no wood, but a hollow opposite to the bud, then the bud is useless. If, on the other hand, there is much thickness of wood left attached, the harder part of it should be carefully cut away. The whole bud and bark ought to be shield-shaped, widest in the middle where the bud is situated, and tapering to a point above and below. The bark of the stock must next be carefully loosened from the wood by means of the handle of the budding-knife, and the bud inserted in the cleft so that its in-

ner surface presses against the surface of the bared wood of the stock. The whole must then be closed and carefully bandaged over, above and below the bud, with raffia. The raffia, which must be applied securely, but not too tightly, should completely cover the bark of the scion and the wound of the stock—only the bud itself projecting uncovered. In three weeks the raffia should be removed. In the following spring, if the budding has been successful, the stock should be cut off immediately above the bud, so that all the energy may be concentrated in its development. See L. H. Bailey's *The Nursery Book* (1895); Baillet's *Grafting and Budding*. See GRAFTING.

Budden Ness, prom., Forfarshire, Scotland, on N. side of entrance to Firth of Tay.

Bude, or BUDE HAVEN, eccles. par., seapt., and wat.-pl., Cornwall, England, 35 m. W.N.W. of Okehampton, amidst grand cliff scenery. Pop. 1,400.

Budge, ERNEST A. WALLIS, Egyptologist, studied at Cambridge, where he was a distinguished Oriental scholar. He has conducted excavations at Assouan in Egypt, at Jebel Barkal in the Sudan, and at Nineveh and Der in Mesopotamia, and is now keeper of Egyptian and Assyrian antiquities in the British Museum. Among the most important of his works are *Assyrian Texts* (1880), *Babylonian Life and History* (1884), *The Dwellers on the Nile* (1885), *Memoir of Dr. Birch* (1886), *The Laughable Stories of Bar-Hebraeus* (1896), *Egyptian Ideas of the Future Life* (1899), *Life and Exploits of Alexander the Great* (1896), *Guide to the Babylonian and Assyrian Antiquities in the British Museum* (1900), *The Book of the Dead* (Eng. trans. of the Theban Recension, 3 vols. 1901), *History of Egypt* (8 vols. 1902, etc.), *The*

IV.

Gods of the Egyptians (1903), *Decrees of Memphis and Canopus* (1904), *Handbook for Egypt and the Sudan* (1905), *The Egyptian Heaven and Hell* (1906), *The Egyptian Sudan, its History and Monuments* (1907), *The Book of the Kings of Egypt* (1908), *Liturgy of Funeral Offerings, etc.* (1909), *Coptic Homilies* (1910), *Book of the Dead* (Egyptian text and trans., 7 vols. 1910), and several works on the texts and inscriptions of ancient Assyria and Babylonia.

Budgerigar. See PARRAKEET.

Budget, the annual statement relative to the finances of a country—in Britain the statement made every spring in the House of Commons by the chancellor of the exchequer. The figures in this statement are given under two heads—first, those relating to the actual expenditure and income of the country for the financial year; and, second, an estimate of the probable expenditure and income for the subsequent twelve months, with proposals as to how any extra expenditure or probable deficit has to be met, either by additional taxation, by loan, or by suspension of the sinking fund, or proposals as to how any surplus is to be utilized, by the reduction of taxation or extinction of debt.

The term budget is often used to indicate the income and expenditure of smaller bodies—e.g. workmen's budgets, family budgets.

Budrio, fort. tn., Italy, 12 m. N.E. of Bologna. Pop. (comm.) 17,000.

Budrissin. See BAUTZEN.

Budrum, seapt., Asiatic Turkey, on N. shore of Gulf of Kos, 96 m. S. of Smyrna; site of ancient Halicarnassus, birthplace of Herodotus. Pop. 6,000.

Budweis, tn. and bishop's see, Bohemia, Austria, on the Moldau, 80 m. S. of Prague. It is an active

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trading and industrial town, manufacturing stoneware, needles, nails, pencils, beer, cigars, spirits, and flour. The cathedral (1500), municipal museum, and episcopal residence are the principal buildings. Pop. 40,000.

Buell, DON CARLOS (1818-98), American soldier, was born in Ohio; graduated at West Point (1841); fought in Texas (1845-46), and in the Mexican war, being wounded at Churubusco. On the outbreak of the civil war he sided with the North, and in 1861, after helping to organize the army of the Potomac, succeeded Sherman in Kentucky. He occupied Bowling Green in 1862, and gained distinction by co-operating with Grant at Shiloh at a critical juncture. Subsequently he met General Bragg (Confederate) in Kentucky, rescued Louisville, and then forced him to retreat at Perryville. He was, however, superseded on account of charges brought against him, and in 1864 resigned from the army. See his defence in *Statement of Major-General Buell* (1884) and *Fry's Operations of the Army under Buell* (1884).

Buenaventura, seapt., Colombia, 10 m. from the Pacific, at the head of Choco Bay. It is an unhealthy tn., but is of importance as the port of the Cauca valley, the richest portion of Colombia. Pop. 5,000.

Buenavista. See BOAVISTA.

Buen Ayre, or BONAIRE. See CURAÇOA. (Fr. *Bonaire*), the most easterly of the Dutch W. Indies, w. coast of Venezuela, 12° 10' N., 68° 25' W. Pop. 5,000.

Buenos Ayres ('good air'). (1.) The largest and most important province of the Argentine Republic. The country is for the most part a plain intersected by numerous streams and studded with lakes. The Atlantic coastline, 740 m. in length, and the river Paraná, 150 m., contain twelve

ports, the chief being Ensenada and Bahía Blanca, besides Buenos Ayres, which has been federalized. The capital of the province is La Plata. The chief industry is sheep-farming. Cattle-grazing is extensively carried on, and the cultivation of wheat, maize, linseed, alfalfa, sugar-cane, vines, and tobacco is spreading. Occasionally the crops are devastated by locusts. Fruit thrives, but its cultivation receives little attention. Area, 117,777 sq. m. Pop. 1,700,000 (without Buenos Ayres).

(2.) Capital of the Argentine Republic, on the w. bank of Río de la Plata; founded in 1535 by Pedro de Mendoza. The city and its suburbs form a federal district. The city is uniformly laid out, the streets intersecting at right angles. There are several wide boulevards, and about a dozen fine squares planted with palms, the finest being the Plaza de la Victoria, with a statue of Liberty. The chief public buildings are the Casa Rosada, or government house, the university (700 to 800 students), with the state library and museum, the cathedral, post office, and exchange. The present cathedral, built in 1732, holds 9,000 persons. The archbishop is head of the Roman Catholic Church in Argentina. The opera-house is an imposing edifice, fit to rank with that of Paris. The centre of the town has been practically rebuilt during the last twenty years, stately buildings of European design replacing the former one-storied whitewashed houses. The chief suburbs are San José de Flores, 5 m. S.W.; Belgrano, 5 m. N.W.; and Barracas, 3 m. S. of the city. They are very beautiful, and are dotted with 'quintas' or country-seats, with well-laid-out gardens. Palermo Park, 2 m. N., on the bank of the La Plata, covers 840 ac., and has its 'Rotten Row' and a zoological

garden. The Recoleta, or Roman Catholic cemetery, lies midway between Palermo Park and the city. The climate is moist, and the temperature is very high at times during the summer, with tropical thunderstorms, and 'pamperos' or dust-storms. The winter is comparatively mild, and frost seldom occurs. The Buenos Ayres docks, known as the Puerto Madero, are very extensive. The north entrance channel has a depth of 20 to 23 ft., the south of 17 to 22 ft., but they have to be kept open by continual dredging. The annual value of the imports reaches £50,000,000, and of exports £55,000,000, nearly one-third being shipped to or from the United Kingdom. Of the trade of the Argentine Republic, about 85 per cent. of imports and 42 of exports pass through the port of Buenos Ayres. Pop. 1,250,000, of whom one-third are Italians.

Buenos Ayres and Pacific Railway, an English company incorporated in 1882. The first section from Villa Mercedes to Chacabuco was opened March 1, 1884. Total mileage (including lines mentioned below), 3,186; gauge, 5 ft. 6 in. The main line is from Buenos Ayres westward across the Argentine to Mendoza, by means of the Trans-Andine Ry. (111 m. long, metre gauge); thence to Las Cuevas, where the Chilean railway system is reached, and through rail connection made with Valparaiso on the Pacific coast. The Buenos Ayres and Pacific Ry. works the Bahia Blanca Ry. (665 m. in length), as well as the Trans-Andine, Villa Maria, and Rufino Ry., and the Argentine Great Western (733 m.). The capital of the Buenos Ayres and Pacific Ry. (apart from the worked railways) is £24,450,000; revenue (year to June 1910), £4,294,432; expenditure, £2,465,253; dividend, 3 per cent.; 674 locomotives, 345 pas-

senger vehicles, and 11,106 goods vehicles, and 29 service vehicles.

Buenos Ayres Great Southern Railway is one of the large railways in the Argentine, its present total length being 3,093 m., the gauge is 5 ft. 6 in. The British company controlling the railway was incorporated Oct. 8, 1862. The first sections opened were as follows: Buenos Ayres to Jeppener (48 m.) on Aug. 14, 1865, and Jeppener to Chascomús on Dec. 14, 1865. The country covered by this system is that between Buenos Ayres and Bahia Blanca, and westward to Neuquen. Capital, £43,481,410; revenue (year to June 30, 1910), £4,601,924; expenditure, £2,516,752; dividend on ordinary stock, 7 per cent.; 546 locomotives, 834 passenger vehicles, 12,320 goods vehicles, and 7 ocean-going steamers.

Buenos Ayres Western Railway forms an important portion of the railways of the Argentine, and includes in its system the first line constructed in that country, 6·2 m. in length, from Buenos Ayres to Floresta, opened Aug. 30, 1857. The 5 ft. 6 in. gauge of the Argentine railways was governed by the gauge of this line, which in turn was chosen because it was the gauge of the contractor's locomotive, purchased secondhand by him from the British military railway in the Crimea, the locomotive itself having been built for an Indian railway, and obtained by the War Office for use in the Crimea! The present Buenos Ayres Western Ry. was incorporated in 1900, and the system is now 1,533 m. in length. The capital received (including £5,966,666 4 per cent. debentures), was £21,566,666; revenue for year ending June 1910, £2,300,509; expenditure, £1,214,569; dividend on ordinary shares, 7 per cent.; 310 locomotives, 344 passenger vehicles, and 7,367 goods vehicles, and 86 service vehicles.

Buen, tn., Spain, prov. of and 12 m. s.w. of Pontevedra. Pop. 7,000.

Buer, vil., prov. Westphalia, Prussia, 9 m. N. of Essen, with coal-mining. Pop. 24,000.

Buff, CHARLOTTE (1753-1828), won the love of Goethe on the occasion of a visit which he paid to her native town of Wetzlar in 1772. She was the prototype of the heroine of his *Leiden des jungen Werther* (1774). See *Goethe und Werther*, ed. A. Kestner (1854).

Buffalo, city and port of entry, New York, U.S.A., co. seat of Erie co., one of the most important commercial and manufacturing centres in the U.S., situated at the foot of Lake Erie and the head of Niagara R., 20 m. above the falls. The area covered by the city is 42 sq. m. It is a great railway centre, and is also connected with the Hudson R. and New York city by the Erie Canal, while the Welland Canal, which connects Lake Ontario with Lake Erie, gives it access to the commerce of ports on Lake Ontario and the St. Lawrence. It has a very large steamship traffic in grain, iron ore, and lumber with the upper lakes. There is a water front of nearly 8 m., and harbours have been constructed for the protection of vessels. The chief industries include iron and steel manufacture, in which it is second to Pittsburg, railroad and street-car works, oil refineries, breweries and distilleries, meat packing, flour mills, brickyards, and manufactories of soap, starch, cigars, furniture, leather goods, etc. The power for these industries is largely obtained from the Niagara R. by a tunnel, and to an increasing extent from the electric supply station at the Falls. The most notable feature of its immense commerce is the shipment through Buffalo of grain and flour from the north central States, and

from the Canadian North-West, to Atlantic ports, both for home use and for Europe. It has also a large trade in coal, lumber, and live stock. The principal parks are Delaware Park (350 ac.) and Humboldt Park (60 ac.). The chief buildings include the City and County Hall, Music Hall, the State Armory and Arsenal, the Masonic Temple, the Buffalo Savings Bank, the Grosvenor Free Library, and the Buffalo Library. Among educational institutions are the university, the State Normal School, and the colleges of St. Joseph and Canisius. There are also several hospitals and charitable institutions. Buffalo dates from 1793, and its commercial development began with the opening of the Erie Canal (1825), since when it has steadily and rapidly advanced. A Pan-American Exposition was held here in 1901, while attending which President M'Kinley was assassinated by an anarchist. The pop. in 1810 was only 1,500; in 1910 it was 423,715. See Smith's *Hist. of the City of Buffalo* (1884), and Powell's *Historic Towns of the Middle States* (1899).

Buffaloes, large mammals placed by Linnaeus in his genus *Bos* (oxen), but now sometimes placed in a distinct genus *Bubalus* (buffalo). They are characterized by the fact that their horns are flattened and angulated, not rounded as in oxen and bison, and are placed below the vertex of the skull. The back has a distinct ridge in the region of the withers. Buffaloes are confined to the Old World, occurring especially in India and Africa; but they are sometimes confused with the bison of N. America. In Celebes there occurs the least specialized of the buffaloes, the small anoa (*B. depressicornis*), while the large Indian buffalo (*B. buffelus*) is a

widely distributed domesticated species. Africa is said to have two species—the *B. caffer* of the Cape, and the smaller *B. pumilus*, which has a wide distribution; but several connecting varieties occur, and it is not quite certain that the two are distinct.

Buffon, GEORGE LOUIS LECLERC, COMTE DE (1707-88), French naturalist, was born at Monthard (Côte d'Or) in Burgundy. During his early manhood he published many scientific treatises, and this resulted in his election as a member of the Academy of Sciences, and in the same year (1739) his appointment as superintendent of the Jardin du Roi in Paris, the present Jardin des Plantes. This was the turning-point of his career, and after ten years' assiduous labour there appeared in 1749 the first three volumes of his famous *Histoire Naturelle*, in the production of which he was assisted by Daubenton. Succeeding years brought forth fresh volumes, the last of which, the thirty-sixth, was published in 1789, one year after his death. He was created Comte de Buffon by Louis xv., and enjoyed the favour and friendship of Louis xvi. Buffon's *Histoire Naturelle* is now almost obsolete, and of comparatively little scientific value; but it had an immense popularity, and created a taste for the study of natural history. See Bazile's *Buffon* (1863).

Bufs, the old 3rd regiment of foot, formed 1572, now the East Kent regiment. In recognition of its descent from the London trained-bands, it has the right to march through the city with colours flying and drums beating.

Bug, a name used sometimes to denote all the insects included in the order Hemiptera, and sometimes reserved for one section of this order, the Hemiptera-Heteroptera. It may be sufficient to say that while all bugs are in-

cluded in the order Hemiptera, the order also includes insects—e.g. the cicadas—to which the term is not applied in common parlance. All bugs are characterized by the fact that the mouth is adapted for sucking; their food consists of the juices of plants or the blood of animals; and as reproduction is frequently very rapid, they may be of great importance in connection with agriculture. Only a few of the more important forms can be mentioned here. The bed-bug (*Cimex lectularius*), a singularly repulsive blood-sucker, is known only among civilized and semi-civilized races, and reproduces with great rapidity. As in most bugs, 'stink glands' are present, and give the insect its disgusting smell. It is generally considered to have been introduced into England by the Huguenots in the 16th century. Allied species occur on birds and bats. The chinch bug (*Blissus leucopterus*) is an American form which attacks corn and grasses, while the cotton-stainer (*Dysdercus suturalis*) similarly injures cotton. The bark-bugs (*Aradidae*) live under the bark of trees, while the very remarkable marine bug (*Halobates*) lives on the surface of the sea. Many bugs live in fresh water. (See BOAT-FLY and WATER-BUGS.) The family Reduviidae includes numerous free-living, predatory forms, which feed chiefly upon insects. A few attack man—e.g. *Conorhinus sanguisuga*, from Arizona, whose bite produces serious and painful results. In this case, as in those of some other poisonous bugs, there is a possibility that the bite introduces some specific organism into the blood.

Bug, two rivers of Russia. (1.) The S. or Black Sea Bug rises in Volhynia, on the frontier of Podolia, and flows s.e. along almost all its course of 450 m. It is only navigable 53 m. above

the mouth at Nikolaiev, where it forms a *lumen* (estuary) 30 m. long which joins that of the Dnieper. The S. Bug is the Hypanis of Greek and Roman geographers, the Ak-su of the Turks. (2.) The W. or Polish Bug rises on the E. slope of the Carpathians, in Galicia, and falls into the Vistula at Novogeorgievsk (Modlin), some 20 m. N.N.W. of Warsaw, after a course of 437 m. Of its whole course, more than half is navigable for vessels of moderate size.

Buga, tn. in the Cauca valley, Colombia, 55 m. by rail E. of the port of Buenaventura. Alt. 3,600 ft. It is in a region of great fertility, and much sugar-cane and coffee are grown. Pop. 12,000

Bugason, or **BUGASAN**, coast tn., W. side of Panay I., Philippines, 24 m. N. by E. of San José de Buenavista. Pop. 14,000.

Bugeaud de la Piconnerie, THOMAS ROBERT (1784-1849), Duc d'Isly and marshal of France, joined the army as a private (1804), and rose to the rank of colonel (1815). By the revolution of July 1830 he obtained a seat in the Chamber of Deputies, was created marshal of France by Louis Philippe, and sent to quell the Arabs in Algeria (1837). His success over Abd-el-Kader gave him the field-marshal's *bâton*, and his victory over the Moors at Isly won his ducal title. He governed Algeria (1840-7), and died of cholera at Paris. See his *Œuvres Militaires* (1883), and D'Joleville's *Le Maréchal Bugeaud* (1881-2).

Bugenhagen, JOHANN (1485-1558), a German Protestant reformer, born on the island of Wollin, in Pomerania. He was converted to the doctrines of Luther (1520), and remained his close and lifelong friend. He wrote a Commentary on the Psalms (1524); and assisted Luther in his translation of the Bible, and in organizing the

reformed church in Germany and in Denmark (1537). He also wrote a *History of Pomerania* (1728; new ed. 1901). See *Life*, in German, by Graepp (1897).

Bugge, ELSÆNS SOPHUS (1833-1907), Norwegian antiquary and philologist, was born at Laurvig; from 1866 to his death professor at the University of Christiania. His specialty was old Norse literature and archæology, including the Germanic languages, and notably Anglo-Saxon. In 1891 he began the publication of a complete set of the Norwegian runic monuments. As early as 1858 he showed his interest in old Norse folk-songs by publishing *Gamle Norske Folkviser*; and in 1867 he issued an edition of the songs of the *Edda* under the title of *Norrøne Fornkvæði*. His works embrace *Studier over de Nordiske Gude og Heltesagns Oprindelse* (1881-9); *Norges Indskrifter med de Aeldre Runes* (1891); *Norrøne Skrifter af Sagnhistorisk Indhold* (1864-73); *Bidrag til den Aeldste Skaldedichtnings-historie* (1894); *Lykiske Studier* (1897; English trans., *The Home of the Eddic Poems*, trans. Schofield, Grimm Library, xi., 1899); *Studies on Northern Mythology* (trans. Stephens, 1884).

Buginese, or **BUGIS**, a Malayan people originally inhabiting the southern peninsula of Celebes, but now spread all over the E. Indies as merchants and traders. They are lighter in colour than the Malays, and superior to them morally, resembling the Javanese in appearance. They are Mohammedans by religion; speak a Malayo-Polynesian dialect akin to the Macassar (see W. Cool's *With the Dutch in the East*; Eng. ed. 1897); and have developed a written literature.

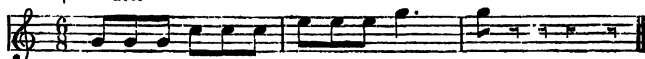
Bugle, a wind instrument emitting a penetrating note. It is generally made of copper and

practised, and with which officers and rank and file alike are acquainted. The bugle is occasionally used for march music, especially in foreign armies—*e.g.* *Chasseurs Alpins*, etc. The following are a few of the more important calls in use in the British service. If a call is preceded by one G, it denotes the right of the line, two G's the centre, and three the left—*e.g.* one G, followed by the 'incline,' 'incline to the right;' two G's before the 'extend,' 'extend from the centre,' etc. See Logier's *Art of Playing on the Bugle* (1820).

drill manual lays down a number of field calls in which all buglers and trumpeters are thoroughly

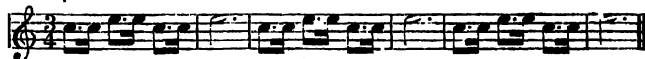
$\text{♩} = 160.$

THE CHARGE.



$\text{♩} = 76$

THE ALARM.



$\text{♩} = 108.$

. REVEILLE.



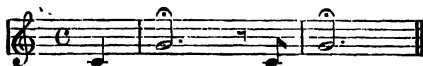
$\text{♩} = 76.$

TATTOO (LAST POST).





LIGHTS OUT.



Bugulma, tn., Samara gov., Russia, 150 m. N.E. of Samara; important fair in September. Pop. 8,000.

Buguruslan, tn., Samara gov., Russia, 106 m. by rail E.N.E. of Samara; cattle and leather trade. Pop. 12,000.

Buhl, tn., Camarenes prov., Luzon I., Philippines, on Buhl Lake, 30 m. S.E. of Nueva Caceres. Pop. 10,000.

Buhl Work, or more correctly **BOULE WORK**, is a species of marquetry invented by Charles André Boule (1642-1732), a French wood-carver. Tortoise-shell, brass, and rosewood are the materials most frequently used in this kind of inlaid work, with highly decorative effect. This artistic method of treatment is applied to the more ornamental articles of furniture, such as drawing-room tables, clock cases, *bric-à-brac* stands.

Buhrstone, or **BURRSTONE**, a name given to certain quartzose

rocks, the worked surfaces of which possess the property of cutting or grinding. They are used principally as millstones. The best kinds are of creamy white, with a granular and somewhat cellular texture, and are obtained in the Tertiary formation of the Paris basin and the surrounding district.

Builder, **THE**, an English illustrated weekly newspaper, was founded in 1842 as the organ of builders, engineers, and architects, by Mr. J. A. Hansom, the architect of the church of St. Philip Neri at Arundel, better known as the inventor of the hansom cab. Nearly two months elapsed between the first and second issues of the *Builder*; but from February 18, 1843, the paper has appeared weekly without intermission. Mr. Hansom retired in 1843, and was succeeded by Mr. George Godwin, who occupied the editorial chair for forty years.

In 1883 Mr. Godwin's place was taken by Mr. H. H. Statham, F.R.I.B.A., the present editor. At a very early date the original design of making the paper a mere trade journal was abandoned, and it became speedily the recognized organ not only of the architectural profession, but of those interested in archaeology and architecture. All subjects are dealt with by specialists, sometimes of world-wide repute.

Building. The erection of any edifice is the work of several distinct trades and professions, and an account of the more important will be found under their respective titles.

The drawings of the proposed building having been prepared by the architect to the satisfaction of the client, a specification governing the workmanship and materials is prepared, and a bill of quantities drawn up, either by the architect, or more generally by a quantity surveyor acting under the direction of the architect. The bill of quantities is afterwards priced by the builder or contractor tendering for the work. The fees for the preparation of the quantities are calculated at rates varying from 2½ per cent. for small contracts to 1½ per cent. for large contracts. The quantity surveyor's charges are generally included in the tender, and paid by the builder or contractor.

The bill of quantities separates the work into various trades.

1. Preamble, including contract conditions and provisions.

2. Excavator, including, all digging for foundations, drains, etc.

3. Bricklayer, including all walls of brick, brick arches, floor tiling, etc.

4. Mason, including all work in stone—*e.g.* walls, sills, steps.

5. Slater or tiler.

6. Carpenter, including floors,

iv.

roofs, and constructional wood-work.

7. Joiner and ironmonger, including skylights, window frames and sashes, doors, wood stairs, architraves, skirtings, hinges, locks, bolts, etc.

8. Plumber and zinc worker, including all coverings of lead or zinc, lead and iron pipe work of water supply and wastes, etc.

9. Plasterer.

10. Founder and smith, including columns, rolled-steel joists, beams, etc.

11. Gasfitter.

12. Bellhanger and Electrician.

13. Glazier.

14. Paperhanger.

15. Painter.

On all works of any magnitude, the client's interests are protected by a 'clerk of works,' acting for the architect, who has the right to reject any unsuitable materials, and to condemn bad or incorrect workmanship.

The workmen in the various trades of sufficient importance work under foremen of those trades—*e.g.* foreman bricklayer, etc., all of whom are under the superintendence of a general foreman, acting for the builder or contractor.

See for different sections under EXCAVATOR'S WORK, ASPHALTER'S WORK, BRICKWORK, SMITH'S WORK, PLUMBER'S WORK, SLATER'S WORK.

Building By-laws. Town and district councils may make various by-laws for the regulation of building in their areas, under the Public Health Act of 1875, amended in 1890 and 1907. This act applies to all town and district councils in England and Wales, and, so far as its principal powers are concerned, is in substance the same as the London and Scotland Acts of 1894 and 1897 respectively. Building by-laws come into force after application by the local

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authority and confirmation by the Local Government Board. Model by-laws are given in the Act of 1876, and supplemental by-laws under the Act of 1890. The model by-laws regulate the width and construction of new streets, and lay down a series of rules for the construction of buildings, which must be of 'bricks, stone, or other hard and incombustible material' (clause 11). The regulations as to thickness of walls and size of timbers, etc., are subject to local modification. Plans for the laying out of new estates, streets, and buildings must be duly deposited with the clerk or surveyor of the council, and must give certain specified information. Buildings begun or put up in contravention of by-laws may, under certain conditions, be pulled down. The building authority in the large Scottish burghs is the Dean of Guild Court. See *Knight's Annotated Model Bye-laws of the Local Government Board* (7th ed. 1905), and *The London Building Acts, 1894-1905*, by E. A. Cohen (1906).

During 1904 the building by-laws, and especially clause 11, were frequently denounced in connection with the movement for building in the country cheap, wholesome, and sightly cottages, of materials other than those specified in the model by-laws. Sec. 44 of the Housing, Town Planning, etc., Act, 1909, empowers the Local Government Board to revoke by-laws which unreasonably impede the erection of dwellings for the working classes.

Building Lease. In Britain, a lease under which the lessee is bound to build on the land demised. It is, consequently, generally for a long term at a ground rent. The ordinary way of developing a building estate is for the owner of the land to enter into an agreement with a builder

to build a certain number of houses on the land, and to covenant to grant him leases of the several plots as the houses are built. Tenants for life under the Settled Land Acts, the universities and colleges under the University and College Estates Act, 1898, and the Commissioners of Woods and Forests, may grant building leases for ninety-nine years, the crown for thirty-one years or three lives, and municipalities for seventy-five years. See GROUND-RENT.

Building Society, a society established by a number of persons to raise by their subscriptions a fund for making advances to members upon mortgage. Such societies are either terminating or permanent. The former terminate at a date fixed by the rules, or when a result aimed at has been attained. The latter are not limited in duration. In Britain these societies are incorporated by registration by the registrar of friendly societies, with whom their rules, which correspond to the articles of association of a company, must be lodged. The liability of members is limited. A society may borrow to the extent of two-thirds of the amount advanced on mortgage, and if this limit is exceeded the committee of management are personally liable. The registrar has extensive powers of control. The annual accounts must be sent to him; he may, under certain circumstances, order an inspection of the books, or convene a special meeting; he has power to cancel the certificate of incorporation if it has been obtained by fraud, or for other specified causes. A dissolution may take place (1) in accordance with the rules; (2) by resolution of three-fourths in number and two-thirds in value of the members; (3) by a winding-up by the court; or (4) by order of the registrar, if sat-

ified, on petition of one-tenth of the members, that the society cannot meet its liabilities. The Building Societies Act of 1894 provides that, in societies established subsequent to that date, applicants for advances from the funds must not ballot for precedence; and power is given to older societies to make an alteration in their constitution in this respect if necessary. Building Societies Acts are dated 1874, 1875, 1884, and 1894. A few earlier societies still survive which have not been incorporated under these acts. See Davis, *On Building Societies* (1887), and Rigley's *How to Manage Building Associations* (1873).

Building Stone. The qualities necessary to a first-class building stone are so many that it is rare to find one which combines them all and is, at the same time, accessible, abundant, and cheap. One prime essential is ability to resist a great, crushing stress, and to bear the weight of a lofty superstructure. This excludes nearly all clay rocks and shales and such granular limestones as chalk, and renders firm, fine-grained sandstone and crystalline rocks such as granite of special value for some kinds of work, as the pillars and abutments of bridges. Resistance to atmospheric action and weathering is of great importance, especially in structures which are meant to endure. Granite and pure siliceous sandstone in this respect hold the first place; calcareous and ferruginous sandstones, limestones of many different kinds, and marbles are less resistant, but are nevertheless largely employed. A good building stone should also be of uniform and pleasing colour; not liable to discoloration on exposure, as are many sandstones containing pyrites and compounds of iron; obtainable in large blocks

and in any quantity; not too expensive to saw and dress; accessible, and easily quarried.

The best varieties of granite are durable, strong, impervious to moisture, and, when of suitable colour, have a pleasing and even ornamental effect; hence such rocks as those of Aberdeen (gray), Peterhead (red), Ross of Mull, Cornwall, and Shap Fell are highly valued in the British Isles. But as they are difficult to dress, and are quarried in remote districts, they are too expensive for general use in large towns. In Aberdeen, however, granite is the principal building stone, and a large amount of polished and cut granite is prepared and exported for ornamental work both in Britain and abroad. Sandstone is perhaps the most widely used of building stones, most of our large cities being to a great extent built of it; but it varies greatly in quality. A good example of a sandstone of tough quality and pure colour, with great durability, is the Craigleith stone, formerly extensively used in Edinburgh and neighbourhood. Limestones are widely employed, especially in the south of England; and the famous Portland stone, which came into favour early in the 18th century, furnished the material for St. Paul's Cathedral. Pure crystalline marbles, though producing a fine effect, are little used in Britain, because of their great expense and their inability to stand the smoke of towns; but they are admirably adapted for interiors. (See MARBLE.) Magnesian limestones, which vary greatly in quality, are among the principal building stones of the British Isles. The siliceous dolomite of Mansfield has been used in many important buildings. Both oolite and Caen stone are limestones of the Oolitic formation; the latter, because of its fine grain and beautiful colour, is

very suitable for delicate ornamental work. Serpentine, dolerite, diorite, and basalt are little used as building stones; their dark colour, and the difficulty in dressing them, are sufficient reasons for their neglect. See the valuable *Report with reference to the Selection of Stone for the New Houses of Parliament* (addressed to Commissioners of Woods and Forests, 1839); E. Hull's *Building and Ornamental Stones* (1872); Hull's 'Building Stones,' in Bevan's *British Manufacturing Industries* (1876); Rivington's *Building Construction* (vol. 'Materials'); J. Gwilt's *Encyc. of Architecture* (1900). For French building stones, Chateau's *Technologie du Bâtiment* (1863-6); for German methods of quarrying and testing, Hermann's *Steinbruchindustrie u. Steinbruchgeologie*; for American building stones, *Stones for Building and Decoration* (Wiley and Sons, New York).

Bultenzorg (= sans souc. 'without care'), tn., Java, stands in the interior at an alt. of 865 ft., 34 m. by rail s. of Batavia. Here the governor-general of the Dutch E. Indies has his summer palace in the midst of one of the best-laid-out botanic gardens (1817) in the world. Pop. 25,000. See M. Treub, *Der botanische Garten zu Bultenzorg auf Java* (1893); and Professor Ernst Haeckel, in *Deutsche Rundschau*, March 1901.

Bulalance, tn., Spain, prov. and 24 m. E. of Cordova; manufactures woollens, etc. Pop. 11,000.

Bujnurd, tn. and Kurd colony, prov. Khorassan, Persia, 155 m. N.W. of Meshed. Pop. 8,000.

Bukhara. See BOKHARA.

Bukharest. See BUCHAREST.

Bukkeffjord. See BUKNFJORD.

Bukkur, or BAKKAR, a fort. isl. of the Indus, Sindh, India, lying between the towns of Sukkur and Rohri; is a limestone rock, 800 yds. long, 300 yds. wide, and about 30 ft. above the stream.

Buknfjord, a large fjord on the W. coast of Norway, crossed by 60° N. lat., between Stavanger and Bergen, with numerous ramifications—e.g. Lysfjord, Sandsfjord, and Sandeidsfjord.

Bukoba, station of German E. Africa, on W. shore of Victoria Nyanza, lat. 1° 20' S.

Bukowina, or BUKOVINA, a duchy and crown-land of Austria; stretches from the Dniester across the Pruth and Sereth, and up the E. face of the Carpathians to the border line with Transylvania. It is very mountainous, and almost one-half of the surface is covered with forests (beech, conifers, alder, etc.). The principal crop is maize. Much fruit is grown, especially in the valley of the Suczawa. Manganese and salt are the only minerals extracted. The area is 4,030 sq. m., and the pop. 175,000. In the W. the majority of the people are Ruthenians, in the E. Roumanians; but there are also Jews, Germans, Magyars, Poles, and Czechs. There is a university at Czernowitz, the capital. See Kaindl's *Geschichte der Bukowina* (1895-98).

Bulacan. (1.) Prov. Luzon I., Philippines; bounded on the S. by Manila Bay. Area, 840 sq. m. It has rich deposits of coal, lead, copper, silver, and magnetic ores; and grows sugar, rice, corn, indigo, and coffee. Malolos, 20 m. N.W. of Manila, is the capital. Pop. 225,000. (2.) Town in Bulacan prov., 7 m. S.E. of Malolos. Pop. 12,000. It was totally destroyed by fire in 1898.

Bulak, or BOULAK, tn., Egypt, r. bk. of Nile; river port of Cairo, of which it forms a N.W. suburb.

Bulan, pueb., Luzon I., Philippines, prov. of and 28 m. S.W. of Sorsogon; a port of call for coasting steamers. Pop. 12,000.

Bulandshahr. (1.) District of the Meerut division of the United Provinces, India, with an area of

1,908 sq. m. It is an alluvial plain lying between the Ganges and the Jumna. The Ganges Canal passes through the district from N. to S. Indigo is the main crop. Pop. 1,150,000. (2.) Or BARAN, the cap. of the dist., 40 m. S.E. of Delhi, is a place of great antiquity. Pop. 20,000.

Bulawayo. See BULUWAYO.

Bulb. From a gardening point of view, all underground stores of plant nutriment which in a dormant state show no signs of roots, stems, or leaves, yet when placed under suitable conditions develop all these appendages, are considered to be bulbs. Tuber of dahlia, corm of crocus, rhizome of anemone, share with the true bulb of onion or tulip this general name. And functionally they all may be considered together, though morphologically the differences are considerable. In a true bulb, such as that of a tulip, we find that almost the whole substance is composed of a series of overlapping fleshy scales. These are really modified leaves, and the little that remains when they are removed is a rudimentary stem to which they were attached. After the tulip has flowered, it accumulates fresh food material in a new bulb, formed by the development of a bud contained among the scales of the old and now withered bulb of the previous year.

A corm is composed of the swollen base of the stem, and not, as with true bulbs, of the leaves—the latter having degenerated into mere membranous sheaths, which have no function beyond serving as protective envelopes for the food-store and living nucleus within.

Among bulbous plants are many of the most beautiful flowering species of our gardens, of our hedgerows, and of our meadows. Lilies, snowdrops, crocuses, daffodils, fritillaries, anemones, and

gladioli are all of this habit. Great care must be taken that no damage be done to the leaves of bulbous plants when their flowering has finished, for it is on the activity of those leaves that the next year's flowers depend. This especially applies to bulbs planted in lawns where the grass requires cutting before the leaves have died their natural death. It is when planted in grass, however, that many bulbous plants, notably crocuses and snowdrops, are seen to best advantage. They should be planted in bold groups, not in mere lines or dots. A good plan in planting is to throw the bulbs boldly about from the hand, and then plant them where they fall. Bulb-growing is a great Dutch industry. The import of bulbs in 1901 realized over 600,000 guilders. See S. Arnott's *The Book of Bulbs* (1901).

Bulbar Paralysis. See PARALYSIS.

Bulbul, an Arabic word, much used in Persian poetry, though there is some dispute as to the bird to which it applies. Ornithologists apply the term to the members of the Indian and African family Pycnonotidae, but the true bulbul is probably a nightingale called *Daulias hafizi*.

Buldana, dist. and tn. in S.W. of Berar, British India. The area of the district is 2,809 sq. m. The chief industry is the manufacture of cotton cloth; the exports are cotton and wheat. Pop. of dist. 425,000; of tn. 4,000.

Bulgaria, a European kingdom, bounded W. by Servia, N. by Roumania, E. by the Black Sea, and S. by Turkey. The chief mountain range is the Balkan, south of which the Sredna Gora range runs parallel. It includes the Vitosha, Rila, and the N. slope of the Rhodope Mts., in which latter range lies Mt. Mus Alla (9,600 ft.), the loftiest peak in Bulgaria. The rivers of Bulgaria

either belong to the Danubian system (e.g. the Timok, forming the boundary towards Servia, the Lom, Osma, Vid, Skit, Isker, etc.), or flow direct into the Black Sea (e.g. the Kamchyk) or the Aegean (e.g. the Maritsa and Struma). The land is, for the most part, hilly, and the geology is that of the Balkans. The climate of Bulgaria is characterized by short, hot, rainless summers, short, dry winters, rainy springs and autumns, and extreme variations of temperature. Including E. Rumelia, joined to Bulgaria in 1885, Bulgaria has an area of 38,080 sq. m., and a population of over 4,250,000. The Bulgarians proper form 74 per cent. of the total population; the Turks, who come next, 19 per cent. Elementary education is compulsory. There is a university at Sofia, attended by about 1,000 students. The state is theoretically the owner of the land; the land-holder has a perpetual lease descending to heirs, and pays one-tenth of the produce by way of rent. About five-sevenths of the population are engaged in agriculture, most of them being peasant proprietors holding from one to six acres. Agricultural produce constitutes 72 per cent. of the exports; cattle, 23 per cent. The imports in 1909 were valued at £6,417,000, and the exports at £1,457,000. The chief fisheries are mackerel in the Black Sea and caviare in the Danube. All minerals belong by law to the state. Coal is mined at Pernik to the extent of 160,000 tons annually. Iron exists in large quantities, and there are deposits of lead and salt. Building stone is extensively quarried. Including the Oriental Company's line, seized by Bulgaria in 1908, there are 1,070 m. of railway open, all belonging to the state, and further lines are under construction. The executive power

is vested in a council of eight ministers nominated by the king, and the legislative power in the Sobranje or National Assembly, elected for five years by manhood suffrage in the proportion of one member to every 20,000 of the population. There is also a Great Sobranje, to which constitutional and other questions may be referred. The state religion is the Greek Orthodox (which 80 per cent. of the people profess), but there is absolute religious toleration. Military service is universal and compulsory. The peace establishment is 55,000, the war establishment 350,000 men.

History.—The earliest inhabitants of this part of the world (Moesia) were Thracians, who can be traced as early as the 3rd and 4th centuries A.D. They were subjugated (7th century) by a horde of Ugro-Finnish conquerors, from whom they took the name of Bulgarians. These Bulgarians came from the banks of the Volga, and the ruins of their capital, Bolgari, still remain there. In the beginning of the 9th century we find Krum reigning, against whom the Greek emperor Nicephorus undertook three expeditions, in the last of which he was killed (811). His skull, chased with gold, became a drinking cup at the Bulgarian banquets. The Bulgarians accepted Christianity in the time of Boris, or Bogoris, who was baptized under the name of Michael in 864. The most flourishing time of the Bulgarian empire was the reign of Simeon (893-927). He had been educated at Constantinople, and was a patron of letters; he defeated the Byzantines in war, twice capturing Adrianople. We have, however, many instances of his cruelty recorded in the chronicles. In the time of Peter (927-968) Bulgaria was divided into Eastern and Western. In

1018 the first Bulgarian empire was brought (1040) to an end by the Byzantine sovereign Basil II., surnamed *Βουλγαροκτόνος*; but it was revived under the brothers Peter and Asen in 1186. In 1211 began the great persecution of the religious sect called the Bogomiles. From 1218-41 John Asen II. ruled, and Bulgaria again enjoyed prosperity. In 1353 the Turks came into Europe, and the whole peninsula gradually fell under their yoke, Bulgaria's turn coming in 1393. From that time till the 19th century the Bulgarians were almost forgotten as a nation. But from 1830, through the influence of the monk Paisios, who in 1762 wrote a Bulgarian chronicle telling of the glorious past of his nation, and through the influence of his pupil, Bishop Sophronius of Vratza, an intellectual movement arose among the upper classes of the nation, with the double object of founding national schools and of getting rid of the influence of the Greek clergy. After the Crimean war, the attacks on the Greek clergy—who by employing only Greek priests, conducting the services of the church in the Greek language, and founding Greek schools, especially after the destruction of the old Bulgarian bishopric of Okhrida, had contributed, perhaps even more than the long years of Turkish tyranny, to the suppression of Bulgarian nationality—led the Sultan to intervene, and in 1870 to grant the Bulgarians an autonomous church organization, with an independent head, the Bulgarian exarch, at Constantinople. In 1876, after the revolt in Bosnia and Herzegovina, the Bulgarian population, chiefly in the vicinity of Philippopolis, revolted; but the rising was speedily crushed by the Turkish troops. Then their example was followed north of the Balkans, and with the same

result. But at the same time the Turkish population, aided by the Pomaks—i.e. Bulgarians who had adopted Mohammedanism—committed excesses against the Christian population, so that by the end of May over fifty villages had been destroyed, and about 12,000 people killed. These atrocities evoked great indignation in Europe, and especially in England, where Mr. Gladstone denounced them in a celebrated pamphlet. Those occurrences led to the international conference at Constantinople of December 1876, and to the outbreak of the Russo-Turkish war of 1877-8. The treaty of Berlin, which mutilated the more generous terms of that of San Stefano, created Bulgaria a principality under the suzerainty of Turkey, while S. Bulgaria was made into a province called E. Rumelia, and Macedonia was handed back to the Turks. The first prince of Bulgaria was Alexander of Battenberg (1879-87). Since 1885 E. Rumelia has been annexed to Bulgaria. The rule of Alexander of Battenberg saw a war with Serbia, in which the Servians were defeated at Slivnitza. The further progress of Alexander was stopped by the intervention of Austria, which resulted in the treaty of Bucharest (1886), and the re-establishment of the *status quo*. Alexander's success did not, however, please Russia, which fomented a conspiracy, by which, on the night of August 21, 1886, the prince was kidnapped, carried to Reni on Russian territory, and forced to abdicate. But Stambulov, then president of the Sobranje (parliament), headed another revolution, which overthrew the provisional government of the conspirators, and recalled Prince Alexander. But through his imprudent submission to the Czar, Alexander left himself no option but to abdicate on September 7,

1886; and he resigned the government into the hands of a regency, presided over by Stambulov. The Sobranje, on July 7, 1887, elected Prince Ferdinand of Coburg, who chose Stambulov for his prime minister. Under the new régime the country made rapid progress, notwithstanding several conspiracies against both Ferdinand and Stambulov. Of these the most notable were the military plot of Major Panitza, who was shot in 1889; and the assassination of the minister Beltchev in the streets of Sofia in 1891. Although Russia refused to recognize Ferdinand as prince, this did not prevent Stambulov from concluding commercial treaties with several of the great powers (1892), and establishing good relations with Turkey, from which he received important concessions for the Bulgarian exarchate in Macedonia. Stambulov resigned in 1894, and in 1895 this statesman, who had contributed so much to the foundation and advance of Bulgaria, was murdered in the streets of Sofia (July 15, 1895), and his assassins were never apprehended. In 1896 Russia formally recognized Prince Ferdinand. In 1903, through the activity of the Macedonian Committee in Sofia, Bulgaria played a persistent, though not fully avowed, part in the troubles in Macedonia. In April 1904 Bulgaria by agreement undertook to prevent the formation of revolutionary committees and armed bands upon her territory, and to prevent brigands and revolutionaries from crossing the border, Turkey undertaking to apply a reform scheme. In 1906 a strong anti-Hellenic movement caused much bloodshed between the Bulgar and Greek populations. On October 5, 1908, Bulgaria threw off her allegiance to Turkey, and declared herself an independent kingdom

—her ruler taking the title of King of the Bulgarians. His sovereignty was recognized by the powers in April 1909. See MACEDONIA; Dacey's *The Peasant State* (1895); Jirecek's *Das Fürstenthum Bulgarien* (1891); Lamouche's *La Bulgarie dans le Passé et le Présent* (1892); Battonberg's *Die Volkswirtschaftliche Entwicklung Bulgariens von 1879* (1891); Samuelson's *Bulgaria Past and Present* (1888); Kanitz's *Donau-Bulgarien u. der Balkan* (3rd ed. 1882); Le Queux's *An Observer in the Near East* (1907).

Bulgarian Language. Bulgarian, an inflected language belonging to the s.e. Slavonic branch of the Indo-European stock, forms but a mutilated remnant of the ecclesiastical idiom of St. Cyril (845 A.D.), the apostle of the Slavs, and inventor of the Cyrillic alphabet, or Cyrillitza, composed of forty-two letters fashioned from the ancient Greek. Two remarkable peculiarities should be noted: the article is placed after the noun—thus, *kon*, 'a horse'; *konët*, 'the horse'; also it possesses the vowel *ä*, which has its analogy only in Roumanian. The geographical limits of the tongue are responsible for a large admixture of foreign words; and Turkish, Russian, Servian, Greek, Romanic, Albanian, Italian, and Persian elements abound. The meanings of words have also altered. Thus, *praviti*, 'to say,' now means 'to do'; and *dmít*, 'to think,' signifies 'to speak.' Turkish adjectives, substantives, and verbs are used, and even pure Slavonic verbs are conjugated in a Turkish way, especially when elegance of expression is aimed at. The literary idiom differs widely from that of conversation and song, and is not very widely understood. See Morse and Vasilief's *Grammar and Dictionary* (Bulgarian-English, 1860), and

Strauss and Dugovich's *Bulgarische Grammatik* (1895).

Bulgarian Milk. See LACTIC ACID BACILLI.

Bulgarin, **TADEI VENEDIKTOVITCH** (1789-1859), Russian journalist and author, of Polish descent, was born in Lithuania. After 1815 he established himself at St. Petersburg, and founded (1823) the *Northern Archive*, and in 1825 a new edition of the political daily the *Northern Bee*. He also wrote several novels in the manner of Sir Walter Scott—e.g. *Ivan Vishigin, or the Russian Gil Blas* (1829; Eng. trans. as *Ivan Vezeeghen, or Life in Russia*, 1831); its continuation, *Peter Ivanovitch Vishigin* (1830); *Mazepa* (1832); etc. He also published (in Russian) *Russia: an Historical, Geographical, and Literary Survey* (1837); and his *Memoirs* (1846-50).

Bulkheads. (1.) *In tunneling*, the vertical partitions of timbers or masonry to keep out water, air, or mud. Such structures may be solid, or provided with doors to give ingress and egress to workmen and materials. (2.) *In harbour work*, the seawalls marking the shore-line. From them project piers and quays. (3.) *On shipboard*, steel partitions, both transverse and longitudinal, which divide a vessel into a number of water-tight compartments, and thus lessen the danger of foundering when the ship is breached. In men-of-war the bulkheads are provided with water-tight doors. Many ships are now fitted with hydraulically-operated bulkhead doors, which close automatically when a compartment is flooded, and are also controllable from the bridge and other stations in the ship. A door can be opened from inside by any person entrapped, but closes behind him. In ships with two or three screws each engine is in a separate com-

partment, as are also the boilers and the coal-bunkers. *Collision bulkheads* are those nearest the bow and the stern.

Bull, an instrument, ordinance, decree, or letter of the Pope, written down to 1878 on parchment in antiquated Gothic script in the Latin tongue, and having usually a leaden seal appended. The word is derived from the Latin *bulia* (q.v.), which means a bubble or capsule of wax enveloping a seal; then it was applied to the seal itself, and, lastly, to the document to which the seal gave authority. Some of the most celebrated bulls were *Clericis Laicos* (1296) and *Unam Sanctam* (1302), by Boniface VIII. against Philip le Bel, king of France; *In Cœna Domini* (1362), by Urban V. against the heretics; *Execrabilis* (1460), by Pius II., in which he proclaimed the superiority of the Pope over the councils; *Exsurge Domine* (1520), by Leo X. against Luther; *Domini ac Redemptor Noster* (1773), by Clement XIV., for the dissolution of the Jesuit order; *Ecclesia Christi* (1801), for the establishment of the Concordat with France, and *Sollicitudo Omnium* (1814), for the re-establishment of the Jesuit order, by Pius VII.; *Ineffabilis* (1854), which contains the dogma of the Immaculate Conception, and *Pastor Æternus* (1870), which proclaims the infallibility of the Pope, by Pius IX. A collection of bulls is called a bullary. The best editions of bullaries are those collected by Coquelines in *Bullarum Collectio* (14 vols. 1733; new ed. 1857), and by Barberi in *Magnum Bullarium Romanum* (19 vols. 1835). See BRIEF.

Bull (Irish), an unconscious and amusing blunder in speech, and implying an evident contradiction in terms, generally attributed, although not confined, to Irishmen. An Irish bull is perhaps better illustrated than defined. Horace

Walpole, in his *Walpoliana*, records one which he considers the best that he had ever heard. 'I hate that woman,' said a gentleman, 'for she changed me at nurse!' A classical example was elicited by the Parnell Commission: 'Better be a coward for five minutes than be dead all the rest of your life.' Cf. *Essay on Irish Bulls*, by R. L. Edgeworth and his daughter Maria (1802; new ed. 1898).

Bull. See CATTLE.

Bull, GEORGE (1634-1710), English bishop, born at Wells, gained a great reputation, especially among continental theologians, by three books on the Trinity—*Defensio Fidei Nicenæ* (1683), to prove that ante-Nicene fathers held the Nicene faith; *Judicium Ecclesiæ Catholicæ* (1694), to prove that Nicene fathers accepted in its full sense the divinity of Jesus; and *Primitiva et Apostolica Truditio* (1703), to prove that the doctrines of Christ's pre-existence and incarnation were not inventions of early heretics. See R. Nelson's *Life of Bishop Bull* (1827).

Bull, JOHN. This typical Englishman takes his origin from an amusing skit by John Arbuthnot, a contemporary of Swift, in his *History of John Bull* (1712). See also *John Bull and Co.*, by Max O'Rell, a satire on English life and customs from a French point of view.

- **Bull, JOHN** (?1563-1628), English musician, and first music lecturer in Gresham College, London. After a brilliant career in England he went to the Continent, where he was organist of Antwerp cathedral. Bull's printed music is small in quantity, the mass of it being unpublished.

Bull, OLE ORNEMANN (1810-80), Norwegian violin virtuoso, born at Bergen, was largely self-taught. After hearing Paganini he followed his style of playing, and

made his *début* in Paris in 1832. Bull seldom performed other than his own compositions, but his playing was full of fire, poetry, and charm; he possessed a 'magnetic personality,' and never failed to rouse his audience to enthusiasm. He played everywhere, but had perhaps most success in America, where, for several years from 1844, Major Pond, the famous *impresario*, paid him £100 a night. See *Memoir* by Sara C. Bull (Eng. 1886), and *Life* (in Norwegian) by Vik (1890).

Bulla, or BUBBLE-SHELL, a genus of gasteropod molluscs in which the oval shells are thin, with a concealed spire, and usually prettily marked with blotches of colour on a pale ground. The species are widely distributed in both tropical and temperate seas, in shallow water.

Bulla, an ornament worn by Etruscan and Roman children as an amulet, and laid aside at maturity. The name was also given to the seals used by the emperors of Constantinople and of the Holy Roman empire, and by the Pope. (See BULL.) In pathology, *bullæ* is a small raised portion of the epidermis filled with watery fluid like a blister.

Bullas, tn., Spain, prov. of and 30 m. w. by N. of Murcia; has many Roman remains. Pop. 8,000.

Bull-baiting, an obsolete sport in which a bull, tied to a stake, and having the points of his horns guarded, was worried to death by dogs. In 1835 the practice was declared illegal in Britain.

Bulldog, THE. The modern bulldog of the show bench is a triumph of the breeder's art. The courage of the modern animal is generally tempered by a host of ailments, while the activity and strength that formerly led to his use for bull-baiting are lost in his crippled malformation and his inability for quick movement.

But this refers chiefly to 'show dogs;' the ordinary animal still retains much of its pristine courage. The bulldog is of a surly disposition, and not capable of strong attachment. In attack it is silent, and for this reason cannot be accounted a good watchdog. It is, perhaps, the most 'fancied' of all breeds, and nearly a dozen special clubs are engaged in fostering its development. There is no whelp more difficult to rear to maturity, the constitution of the breed having been undermined by inbreeding; and the 'toy' bulldog, a miniature replica of the larger animal, is even more fragile. There is great variety in the size of this breed, individuals scaling from 12 to 60 lbs. in weight. Toy bulldogs must be under 22 lbs., and the other classifications are under or over 35, 45, and 55 lbs. The points of the bulldog are as follows:—Thick set and compact in build; very heavy in front, and comparatively light behind; legs strong and short, muscular, and set outside the body; shoulders massive, and standing well out; chest wide and deep; skull large; temples high, with stop well defined; eyes wide apart and black; under jaw wide, projecting, and turned upwards; face as short as possible, and deeply wrinkled; nose large, black, and good 'lay back'; small rose ears; the bottom teeth should project at least half an inch in advance of the top ones; a good dewlap; back short and roached; ribs well sprung; fine loin, well tucked up; tail short, knicked, and set on low; accepted colours are brindle, fawn, red, and white, or white pied; coat fine and smooth; action rather slovenly, the hind legs not being lifted high, and in the motion a swing of the body peculiar to this breed.

Bullen, FRANK THOMAS (1857), English writer on sea life, born at Paddington, London; served at

sea (1869-83) on a whaler. From 1883 to 1899 he worked as clerk in the Meteorological Office. Among his writings are *The Cruise of the 'Cachalot'*, with introduction by Kipling (1898), *Idylls of the Sea* (1899), *The Log of a Sea Waif* (1899), *Men of the Merchant Service* (1900), *With Christ at Sea* (1900), *Deep-sea Plunderings* (1901), *A Whaler's Wife* (1902), *A Sailor Apostle* (1903), *Sea-Wrack* (1903), *Creatures of the Sea* (1905), *Back to Sunny Seas* (1905), *Frank Brown* (1906), *Our Heritage the Sea* (1906), *The Call of the Deep* (1907), *Young Nemesis* (1908), *Cut off from the World* (1909), and *The Bitter South* (1909).

Buller, CHARLES (1806-48), lawyer and politician, born at Calcutta, was a private pupil of Thomas Carlyle. He practised chiefly in Indian and colonial appeals; was interested in reforms of parliamentary procedure and of the poor law; and originated the Record Commission. He was secretary (1838) to Lord Durham when the latter was governor-general of Canada, and along with Wakefield drew up the famous Canadian report. See Froude's *Carlyle* (new ed. 1890); Lord Houghton's *Monographs* (1873), 236-45; Walpole's *Hist. of Eng.*, vol. iii. (1878-86).

Buller, SIR REDVERS HENRY (1839-1908), English general, was born near Crediton, Devonshire. He served in China (1860), in the Red River expedition (1870), and in the Ashanti war (1874). But it was in the Kaffir and Zulu wars of 1878-9 that Sir Redvers came to the front as a soldier of exceptional resource and daring. In the Boer war of 1881 he served as chief of the staff to Sir Evelyn Wood. In 1882 he was head of the intelligence department in the Egyptian campaign, and again he was chief of the staff in the Sudan war, 1884-5. He was appointed quartermaster-general in 1887.

and under-secretary for Ireland in the same year. From 1890 to 1897 he acted as adjutant-general; in 1899-1900 he served in S. Africa, first as general commanding the forces in S. Africa, and afterwards as general officer commanding in Natal. He conducted three unsuccessful operations for the relief of Ladysmith, which was effected only after an investment of 119 days. He was subsequently engaged in the expulsion of the Boers from Natal; and on his return to England he was appointed to the command of the First Army Corps at Aldershot—a position which he was called on to resign (1901) owing to an imprudent speech. He retired in 1906. See *Life* by L. Butler (1909).

Buller, Sir Walter Lawry (1838-1906), New Zealand lawyer, was born at Canterbury. He was called to the bar of the Inner Temple in 1874; was commissioner for the colony to the Colonial and Indian exhibition (1886), to the Paris exhibition (1889), and colonial representative at the Imperial Institute (1891-6). He wrote *A History of the Birds of New Zealand* (1873; 2nd ed. 1888), and a *Supplement* to the same (1906). He was made K.C.M.G. in 1886.

Bullet. The solid projectiles fired from small-arms are known as 'bullets,' in contradistinction to cannon balls (now obsolete), which were artillery projectiles. With smooth-bore muskets the form of bullet was necessarily spherical. Those used in the British army before the introduction of rifles were of lead, 1½ to the pound in weight. For some of the earlier forms, see **RIFLE**.

When small-bore rifles were adopted, the diameter of the bullet was necessarily much reduced. Although its weight was diminished, it was still necessary for its efficiency that it should not be too light. It had therefore to

be made much longer proportionately to its diameter than the old bullet. It is essential to the accuracy in direction of an elongated projectile that it should fly point foremost, and it is the rotation imparted to it by the grooving of the rifle which prevents its turning over during its flight. The longer the bullet is in proportion to its diameter, the more rotation it requires to keep it in position. This is why the grooving of the small-bore rifle has a far more rapid twist than had that of the large-bore. A bullet, however, of so soft a metal as lead, treated to this rapid rotation in the bore of a rifle, would issue from it a shapeless mass, and fly quite inaccurately; therefore the modern bullet has a casing of hard metal (usually cupro-nickel) covering a core of lead and antimony. This hard metal envelope cannot be expanded by the explosion of the charge, and accordingly the small-bore bullet has no cavity in the base. To force it to take the grooves, it is made to cut its way into them by giving the bullet a slightly larger diameter than that of the barrel through which it will have to travel.

The bullet for the Lee-Enfield firearm (calibre .303 in.), at present in use in the British army, has a diameter of .311 in. It weighs 215 grains, and is 1½ in. long. Most foreign powers, and notably Japan, France, Germany, and America, have decided on a pointed bullet. This form is found to retain its velocity longer than does the old pattern. Its trajectory is consequently flatter, and its danger zone longer. Thus at 500 yards the British bullet is over 13 feet above the ground, while the German-pointed bullet is under 7 feet. For the prohibition of explosive and expansive bullets, see **HAGUE CONFERENCE**.

Bull-fighting is the national sport of Spain, but has been in-

roduced into Spanish America and France, where, in spite of the prohibitive laws of the country, it has taken a great hold on the people. The bulls used in Spain are bred upon the plain between the sierras and the marshy coast-land of the south. The choosing of suitable animals from a large herd is considered excellent sport, and by many Englishmen is preferred to the amphitheatre performance; agility and courage are required in the highest degree. The owners ride to the grazing ground with their friends and several *novilleros*, or apprentice fighters. The *novilleros* tease the young bulls (*novillos*), and ward off dangerous rushes by long lances with blunt points. On the occasion of a bull-fight the processional entry into the arena is one of the chief attractions. In the front rank walk three *matadors* (popularly 'espadas'), who are the principal actors in the show. Then come the *banderilleros*, whose task it is to infuriate the bull by planting darts (*banderillas*) in his shoulders. The *picadores*, mounted on worn-out horses and armed with lances, follow. Last of all come the *monos sabios*, attendants who lead spare horses with bright-coloured saddles. The procession passes across the arena and salutes the mayor. Then the *picadores* move off with their horses, the *banderilleros* shake out their red and yellow capes, and the arena fills with attendants in blue overalls, vermilion shirts, and red hats with blue knobs. All these supers carry sticks, with which to urge on the horses when they show signs of falling.

Directly the bull is let into the arena, a *banderillero* runs up to it and flourishes a cape before its eyes. He then runs toward the railing, the bull at his heels, and the fight commences. The *banderilleros* throw their

bright-coloured darts, with streamers attached, into the animal's neck. In the event of the bull not showing sport, crackers are attached to the heads of the *banderillas*. These explode and burn under the skin, driving the poor animal nearly frantic. When this has gone on for some time, and the bull is half mad with pain and rage, the *matador* salutes the mayor. He wears a pigtail, and carries a bright vermilion cloth, called the *muleta*, and a sword. Then ensue the most exciting moments of the fight, ending with the death of the bull at the hands of the *matador*, although in some cases the encounter proves fatal to the latter.

The popularity of these chiefs of the ring is remarkable. One of the most popular *matadors* was Rafael Guerra, commonly known as Guerrita, who retired with an enormous fortune. He was probably the greatest bull-fighter of any time; his chief rival was Manuel Espartero, who was killed in the bull-ring of Madrid. See Dogado's *La Tauromachia* (1894); Hoot's *Les Courses de Taureau à Paris* (1890); Lozano's *Manual de Tauromaquia* (Seville, 1882); and Chapman's *Wild Spain* (1893).

Bullfinch (*Pyrrhula europæa*), a common and handsome bird, with a red breast, coal-black head and quills, and gray back. It is readily tamed, and is often kept in confinement.

Bullhead, or MILLER'S THUMB, a name applied to various species of the genus *Cottus*, small fresh-water or littoral bony fishes, common in the north temperate zone. The head is broad, depressed, and armed with spines; as in many shallow-water fish, scales are absent. The common marine species, *C. bubalis* and *C. scorpius*, are typical littoral fish, to be found in every pool. The fresh-water *C. gobio* is stated to be sometimes used as food.

Bulli,^{*} tn., Camden co., New South Wales, 40 m. s. of Sydney; headquarters of the Bulli and other coal-mining companies. Pop. 2,500.

Bullinger, HEINRICH (1504-75), Swiss reformer, was born at Bremgarten; became Protestant pastor of Bremgarten in 1529, and of Zürich (1531) in succession to Zwingli, of whose followers he became leader in their struggle against Catholics and Lutherans. He assisted in drawing up the first Helvetic confession of faith at Basel in 1536. With Calvin and Farel he drafted an agreement on the subject of the Lord's Supper between the churches of Geneva and Zürich. He wrote numerous volumes of sermons, in high repute in England, and published at Cambridge by the Parker Society; a *Life of Zwingli* (1535); and *Reformationsgeschichte* (3 vols. 1838-40). See *Life* by Pestalozzi (1858) and Christoffel (1875).

Bullion, uncoined gold and silver in bars or other masses; the word is also used to distinguish metallic from paper money, and occasionally means coin not allowed to pass, or not current at the place where it is tendered. The word was originally applied to the mint, or the place where precious metals were alloyed and converted into stamped money; derived from the Latin *bulla*, 'a lead stamp.' At different periods in history the proportions of bullion—gold and silver—produced have varied considerably: in 1493-1520 the production of gold and silver was respectively 57 and 43 per cent., while in 1581-1600 the production was in the ratio of 17 and 83; but when the gold mines in Australia were brought into operation, the proportion of gold to silver was in the ratio of 77 to 22—a marvellous transformation. In recent years, however, the production of silver has exceeded that

of gold on several occasions; but at the present day there are not many points per cent. between the relative production of the two metals. In 1810 a bullion report was made to the British Parliament by Francis Horner and Sir Robert Peel, who promoted the resumption of specie payments, which had for many years been suspended. See **GOLD, SILVER, MINT**; also Jacob's *Historical Inquiry into the Production and Consumption of the Precious Metals* (1831), and Soetheer's *Materialien zur Beurteilung der wissenschaftlichen Edelmetallverhältnisse* (1886), which is undoubtedly the standard book on the subject. Among recent English works see Lord Avebury's *History of Coins and Currency* (1903), Del Mar's *History of the Precious Metals* (1880), and Shaw's *History of Currency* (1895).

Bull-roarer, the name given by English boys to a plaything which consists of an oblong piece of wood tied to the end of a long string. This, when swung rapidly round, produces a loud humming sound. Mr. Andrew Lang (*Custom and Myth*, 1884, pp. 29-44; new ed. 1898) has raised this toy into a position of scientific importance by showing that it is no other than the *rhombos* used in ancient Greek rites, and that it is an essential in certain ceremonies practised by the aborigines of Australia and by other primitive races. The question has been further studied by Dr. Schmeltz (*Das Schwirrholtz*, 1896), by Dr. J. G. Frazer, and by other writers cited by him (*The Golden Bough*, 1900, iii. p. 423 f.).

Bull Run, river in N.E. of Virginia, U.S.A., a sub-tributary of the Potomac, famous for two battles fought on its banks during the American civil war—(1) on July 21, 1861, when the Northern forces under M'Dowell were defeated by the Confederates led by Beauregard and J. Johnston;

(2) on Aug. 29-30, 1862, when the Northern general Pope was defeated by Lee and Jackson in command of the Confederate forces. To the victors these battles were known as the first and second battles of Manassas.

Bulls and Bears. See STOCK EXCHANGE.

Bull-terrier. The bull-terrier is an essentially English dog, and is perhaps commoner than any other terrier. It is a fighting dog; in the pottery districts there is a great demand for it, and its breeding has been carried to high perfection. It has great courage, and tackles badgers and other hard-biting vermin with delight; but to its master it is of a gentle disposition, and this has made it a favourite everywhere. The average weight of the original type was about 35 lbs., but the fancier has evolved the toy variety, and there are now classes for under 7 lbs., 7 lbs. to 10 lbs., 10 lbs. to 30 lbs., and over 30 lbs. Points:—Head long and wedge-shaped, level as possible from skull to head of nose; jaw strong; mouth level; eyes small, dark, and not too prominent; chest broad; body short and well ribbed up; fore legs medium length, showing plenty of bone and muscle; feet strong and well arched; hind legs well hooked; tail fine and straight, carried in line with back when not excited (if excited, game dogs will uplift them); coat fine, short, and smooth. As to colour, pure white, with a black nose or eye, is most approved; but red, fawn, blue, brindle, and pied colours are allowed, although they stand little chance in competition.

Bull Trout, or GRAY TROUT (*Salmo cambricus*), a fish allied to the salmon, common in many British waters. In comparison with the salmon its lower jaw is less elongated, the scales are smaller, the anal fin is nearer the tail, the vertebrae (fifty-nine) are

one less in number, and the shoulders are thicker. Its flesh is somewhat coarser, and as it is a bad riser to the fly, it is not so much prized by anglers. In the spawning season the head of the male becomes olive-brown, and the body orange-brown, while the female is dark gray. The name is also given to other varieties of the Salmonidæ.

Bully, comm., Pas de Calais dep., France, 10 m. N. by W. of Arras. Pop. 5,800.

Bulmer, WILLIAM (1757-1830), eminent London printer, who produced the *Boydell Shakespeare* (1791-1805), 9 vols. folio, with vol. of engravings by Boydell (1803) entitled the *Shakespeare Gallery*. The book was illustrated by the engravings of Bewick, a close friend of the printer. Other magnificent works printed by Bulmer were *Milton* (1793-7, 3 vols. folio), *Goldsmith* (1795, 4to), *Parnell's Poems* (1795, 4to).

Bülow, BABETTE VON. See ARNOLD, HANS.

Bülow, BERNHARD HENRY MARTIN CHARLES, PRINCE VON (1849), imperial chancellor of the German empire (1900-9), was born at Klein Flottbeck, Holstein. In 1873 he entered the diplomatic service, and in 1878 was secretary of the Berlin Congress. He was successively first secretary of the embassy at Paris (1880) and at St. Petersburg (1883), minister at Bucharest (1888), and ambassador at Rome (1893-7), when he was appointed Prussian minister of state, and was made count in 1899, after the acquisition of the Caroline and Marianne Islands. In the following year he became chancellor of the German empire and prime minister of Prussia, in succession to Prince Hohenlohe. He was supported in the Reichstag by the 'bloc'—a combination of Conservatives, National Liberals, and Centre. He resigned in 1909 in consequence

of the rejection by the Reichstag of the Government Inheritance Tax Bill. In June 1905 he was raised to the rank of prince.

Bülów, FRIEDRICH WILHELM, COUNT VON (1755-1816), Prussian general, served with distinction in the campaign of the Rhine; fought with Blücher at Eylau and Friedland; and in 1813 defeated the French at Möckern, saved Berlin, and routed Marshal Ney at Dennewitz—which gained him the title of Count of Dennewitz. He was engaged in the battles of Leipzig and Soissons. At Waterloo he was in command of Blücher's division. He then returned to his post in Lithuania, where he died. See *Life* by Varnhagen von Ense (1854).

Bülów, HANS GUIDO VON (1830-94), German pianist and conductor, born at Dresden; adopted the theories of Wagner, under whose guidance he placed himself, and, having completed his training under Liszt, made his first concert tour in 1853. From 1855 to 1864 he was principal pianoforte teacher at the Stern Conservatorium, Berlin, and in 1864 became conductor of the royal opera and director of the Conservatorium at Munich, where he organized model performances of Wagner's works. After 1869, when he left Munich, he held appointments as conductor at Hanover, Meiningen, St. Petersburg, Hamburg, and elsewhere. Allowing for some eccentricities both as a man and as a musician, he was a splendid interpreter of the pianoforte classics, and was eminently successful as a conductor. His memory was extraordinary, and he was the first to set the fashion of conducting without book. His editions of Beethoven and other masters of the pianoforte are of high value. See his *Briefe*, ed. by Marie von Bülów (5 vols. 1895-1905).

Bulrush. The true bulrush (*Scirpus lacustris*) is a native of Britain, occurring in streams, ponds, and occasionally in boggy ground, its spiked inflorescence of reddish-brown flowers appearing in late summer. The plant is four feet or more in height, the stems are terete, and the leaves are flat or ribbon-shaped. The great reed-mace (*Typha latifolia*) is often called the bulrush. The stem of this handsome plant is often seven feet in height, and in July culminates in a brownish cylinder of pistillate flowers, this again being crowned with a thin spike of male flowers.

Bulsar, scapt. tn., India, 115 m. N. by E. of Bombay, with an export trade in timber. Pop. 13,000.

Bulthaupt, HEINRICH (1849-1905), German poet and dramatist, born at Breiten, where he became (1879) librarian of the municipal library. He belonged to the school of German poets who aimed at the special cultivation of form; and among his more notable works were the dramas, *Die Arbeiter* (1876), *Eine neue Welt* (1886), *Der verlorene Sohn* (1889), and a volume of poems, *Durch Frost und Glut* (3rd ed. 1900). He gained great renown by his *Dramaturgie des Schauspiels* (4 vols. 1882-1901), *Dramaturgie der Oper* (2 vols. 1887; 2nd ed. 1902), and *Shakespeare und der Naturalismus* (1893).

Bulti. See BALTISTAN.

Buluwayo, or BULAWAYO ('the place of killing'), in Rhodesia, S. Africa, formerly the kraal of Lobongula, king of the Matabele, now a British town and centre of trade. The present town lies on the open veld, 220 m. s.w. of Salisbury, and has a white population of about 4,000. It is connected with Cape Town and with Beira (n.d. Salisbury) by railway and telegraph, and with the Wankies coal field and the Zambesi at Victoria Falls.

Amongst its public buildings is the Rhodesia Museum. There are gold mines in the vicinity. The transcontinental telegraph now connects it with Ujiji, on Lake Tanganyika.

Bulwark, a British battleship of 15,000 tons and 18 knots, launched at Devonport in 1899.

Bulwer, WILLIAM HENRY LYTTON EARLE, BARON DALLING AND BULWER (1801-72), English diplomatist, known as Sir Henry Bulwer, and elder brother of Lord Lytton, was born in London. He sat in Parliament for Wilton (1830), Coventry (1831), and Marylebone (1835). For the next thirty years he devoted himself entirely to diplomacy at Constantinople, Paris, Madrid, and America (where his name is still associated with the Clayton-Bulwer treaty). After serving as envoy-extraordinary to Tuscany (1852-5), he was again accredited to Constantinople in 1857, and remained there till 1865. In 1868 he was elected member for Tamworth, and retained that seat until his elevation to the peerage (1871). Bulwer had a great reputation as a diplomatist, and achieved some distinction as the author of two volumes (1867-70) of *Historical Characters* (Talleyrand, Cobbett, Canning, and Mackintosh), and a *Life of Viscount Palmerston* (1870).

Bulwer-Lytton, SIR EDWARD. See LYTTON.

Bumboat, a wide, flat boat used in Holland. The name is also applied to the boats of small traders (often women) who sell provisions, clothing, etc., to vessels lying in roadsteads.

Bunbury, seapt. tn., W. Australia, beautifully situated on the shore of Koombanah Bay, 112 m. s. of Perth. Favourite resort of summer visitors. Fish are abundant, and feathered game, especially black swans, are plentiful. Pop. 3,000.

Bunbury, SIR HENRY EDWARD (1778-1860), seventh baronet, in 1815 was appointed special commissioner with Lord Keith to convey to Napoleon the British government's decision regarding his exile. Bunbury was greatly interested in the volunteer and working-class movements, formed a fine library and collection of pictures, and wrote *Narrative of Certain Passages in the Late War with France* (1852), and other valuable books. See *Memoir and Literary Remains*, edited by his son (privately printed, 1868).

Bunbury, HENRY WILLIAM (1750-1811), father of preceding, English caricaturist, was the younger son of Sir William Bunbury of Mildenhall in Suffolk. His caricatures, which, though somewhat broad, were free from personalities and non-political, were founded on the style of Gillray and Rowlandson, and were executed in pencil and chalk. His sketches of foreign costumes, burlesques, and illustrations to *Tristram Shandy* (1773) achieved great popularity; and of his *Directions to Bad Horsemen* (1781), Sir Joshua Reynolds said that the plates excelled everything else of the kind.

Buncrana, mkt. tn. and sea-bathing resort, Co. Donegal, Ireland, on E. coast of Lough Swilly, 10 m. N.W. of Londonderry; famous for salmon-fishing.

Bund, AFRIKANDER. See AFRICANDER.

Bundaberg, port on the Burnett R., Cook co., Queensland, 8 m. from its mouth, 217 m. by rail N. of Brisbane, in important sugar-growing and manufacturing district. Pop. 5,200; with 5 m. radius, 10,000.

Bundelkhand, or BANDALKHAND, tract of country in Central India, lying between the Jumna and Chambal. Area, 10,322 sq. m.

The country is very fertile. It possesses deposits of iron ore, diamonds, and copper. Pop. 1,300,000.

Bunder or **Bandar Abbas**. See **BENDER ABBAS**.

Bundesrath, the federal council of the German empire, consisting of fifty-eight delegates appointed by the governments of the individual states for each session. In conjunction with the Reichstag it exercises legislative functions, and though mainly a confirming body, it may reject measures passed by the Reichstag, and has limited initiatory powers. Members may appear and speak in the Reichstag on matters directly connected with their states, but are not eligible for election to that body. See *Cambridge Modern History*, vol. xi. ch. 16 (1909), for a full account.

Bundheim. See **HARZBURG**.

Bundi, or **BOONDEE**, feudatory state in Rajputana, India. Area, 2,220 sq. m. Pop. 170,000. — **BUNDI**, the chief town, is 95 m. S.E. of Ajmera. Pop. 20,000.

Bundoran, vil. and wat.-pl., Co. Donegal, Ireland, on Donegal Bay, 4 m. S.W. of Ballyshannon. Near it are barvtes mines.

Bungalow, the Anglo-Indian word for a one-storied house with a wide veranda, the typical residence of Europeans in the tropics. It is also used for similar types of house which have been erected in Europe and America. The dak-bungalows are the rest-houses built by the Indian government for the use of travellers.

Bungay, mrkt. tn., Suffolk, England, on Waveney and G.E.R., 14 m. W. of Lowestoft; has large printing works, flour mills, silk factory, etc. Pop. 2,000.

Bungener, **LOUIS FÉLIX** (1814-74), French Protestant theological writer, born at Marseilles, of German descent. He studied theology at Geneva, and taught there from 1843 to 1848. He

wrote several very popular works which, in the form of novels, defended Protestantism—e.g. *Un Sermon sous Louis xv.* (1844; 7th ed. 1881), *Histoire du Concile de Trente* (1846), *Trois Sermons sous Louis xv.* (1849; 6th ed. 1902), *Voltaire et son Temps* (1850), *Rome et la Bible* (1859), *Rome et le Vrai* (1873), *Calvin* (1862), *Lincoln* (1865), *St. Paul* (1867), *Pape et Concile au XIX^e Siècle* (1870). Almost all these were translated into English shortly after their publication. See Gambier's *Félix Bungener* (1891).

Bunion, a swelling at the base of the great toe. Gout, or the rheumatic constitution, may predispose to it; but the exciting cause is always ill-fitting foot-gear, causing abnormal pressure on the joint. Chronic inflammation is set up, and perhaps a false bursa is formed over the joint. In bad cases the tendon of the muscle which extends the great toe may be displaced. The bones are thickened by chronic inflammation, and the joint may become disorganized, with suppuration. The trouble is more common with women than with men. Soothing lotions may be used, and iodine painted over the enlargement of the joint later. In bad chronic cases the remedy recommended is excision of the head of the metatarsal bone.

Bunker Hill, one of two small hills behind Charlestown, a northern suburb of Boston, Massachusetts, U.S.A. Here was fought the first battle of the American War of Independence, June 17, 1775, in which victory finally rested with the British. A granite column commemorates the action.

Bunkimachandra Chatterji, or **BANKIM CHANDRA CHATTERJI** (1838-94), Bengali novelist; first graduate of Calcutta University; served for many years as a magistrate in Bengal. He wrote his

torical and social romances, distinguished for richness of imagination and constructive ability. The most famous were *Dargesa Nandini*, or *The Chief's Daughter* (1880); *Kapala Kundala* (trans. H. A. D. Phillips, 1885); *Bisha-Brikka* (1872), or *The Poison Tree* (trans. Mrs. Knight, 1884); and *Krishna Kanta's Will* (trans. Mrs. Knight, 1895).

Bunkum, or **BUNCOMBE**, empty speech-making, tall-talk oratory intended to gull rather than to enlighten. The word is derived from Buncombe, N. Carolina, U.S.A. Near the close of a debate on the Missouri question in the sixteenth Congress, the member for that division insisted on inflicting a long speech on a dwindling house, saying apologetically that he was 'speaking for Buncombe.'

Bunsen, CHRISTIAN CHARLES JOSIAS, BARON VON (1791-1860), German diplomatist and scholar, was born at Korbach, Waldeck. After spending some years (1818-27) as secretary to the Prussian embassy in Rome, he was appointed ambassador there in 1827, and filled this office until his recall in 1838. After serving a short time as ambassador at Berne (1839-41), he was appointed to the corresponding post in England, where he remained for the rest of his official life. On questions of church organization he did not always agree with the king of Prussia, and he formulated his views in *Die Verfassung der Kirche der Zukunft* (1845). Appointed commissioner to settle the dispute with Denmark about Schleswig-Holstein, he in 1848 presented to Lord Palmerston a *Memoir on the Constitutional Rights of the Duchies of Schleswig and Holstein*; but his views were not accepted by the British premier. The outbreak of the Crimean war led to his recall (1854). Although he retired in-

to private life, his *Zeichen der Zeit* (1855, showed that he still took a deep interest in political affairs. See the *Memoir*, in German, by his widow (1868-71); her own *Life and Letters*, ed. by Hare (1879; 6th ed. 1890); Bunsen's *Correspondence with Frederick William IV.*, ed. by Ranke (1873).

Bunsen, ROBERT WILHELM (1811-99), German chemist, was born in Göttingen. He held four chairs—at Kassel in 1836; Marburg, 1838; Breslau, 1851; and Heidelberg, 1852-89. He laid the foundations of modern organic chemistry. His examination of the waste gases from blast-furnaces led to great economies in their working, as well as to his development of the methods of gas analysis. In 1852 he investigated the electrolytic preparation of the metals, including magnesium, of which he examined the light-giving capabilities; and with Kirchhoff, in 1859, he developed the methods of spectrum analysis, discovering the elements caesium and rubidium. In the course of these and other researches he invented the battery, burner, grease-spot photometer, filter-pump, ice and vapour calorimeters that are associated with his name and in use in every laboratory throughout the world. Among other books, he wrote *Chemische Analyse mit Spektralbeobachtungen* (1861), with Kirchhoff; *Gasometrische Methoden* (1857; Eng. trans. by Roscoe 1857); and *Flammenreaktionen* (1880; 2nd ed. 1886). See *R. W. Bunsen: ein Gedächtnissblatt* (1900), Debus's *Erinnerungen an R. W. Bunsen* (1901), and Roscoe's *Memorial Lecture Jour. Chem. Soc.* (1900).

Bunsen Burner. In this appliance a jet of coal gas is directed into a tube which is open at both ends, and usually vertical. As a result air is drawn in by the current of gas, and mixes with it, so

that, when ignited at the top of the tube, the mixture burns with a very hot, non-luminous flame. Bunsen burners are used for heating by gas, both for technical and domestic purposes.

Bunsen Cell. See CELL, VOLTAIC.

Bunt. See PLANTS, DISEASES OF.

Bunter, in geology the lowermost subdivision of the Triassic or New Red Sandstone, so called from a German word meaning 'variegated.' It consists of mottled red sandstones and breccias, with interpolated pebble beds. Few fossils are found in these rocks, which seem to have been deposited in old salt lakes, in countries subject to desert conditions. In Britain their principal exposure is in the Midland counties (e.g. Cheshire and Staffordshire), where their greatest thickness is about 2,000 feet. The red sandstones have been used for building—e.g. Chester cathedral.

Bunting, a general term applied to birds belonging to the family Emberizidæ. They are related to finches, and common examples are the yellowhammer, corn-bunting, and snow-bunting.

Bunting, JABEZ (1779-1858), 'second founder of Methodism,' was a Manchester tailor's son. In London he filled the highest posts in his denomination, and transformed the Methodist Society into a self-governing church, over which he exercised great authority. His chief interest was in the Wesleyan missions. See *Life* by T. P. Bunting (1859).

Buntingford, mrkt. tn., England, co. of and 10 m. N. by E. of Hertford; manufactures leather and malt. Pop. 5,000.

Bunyan, JOHN (1628-88), author of the *Pilgrim's Progress*, was born at Elstow, Bedfordshire, where people of his surname can be traced back to the 12th century. Nevertheless there is good reason

to believe that John Bunyan belonged to a caste of itinerant tinkers or gypsies. For a full discussion of this question, reference may be made to F. H. Groome's *Gypsy Folk-tales*, pp. 293-295 (1899).

Bunyan's early youth, according to his own account, was notoriously ungodly; but although he fought for a few months as a soldier in the Parliamentary army, his marriage to a young woman of religious character when he was only nineteen, his subsequent baptism and admission to 'church privileges,' and the fact that his *Sighs from Hell* (a record of spiritual struggle) appeared when he was just two-and-twenty, all point to his having abandoned his evil ways at the very outset of his career. Bunyan soon began (1655) to preach in the villages, and his graphic discourses had a powerful effect upon his hearers. In 1656 he wrote his *Gospel Truths Opened and A Vindication* of it (1657), both directed against the Quakers; and at the assizes in the following year an indictment was preferred against him for preaching at Elstow. Although for the time he escaped punishment, soon after the restoration he was convicted (Nov. 1660) as 'a common upholder of several unlawful meetings and conventicles,' and was committed to Bedford jail, where he remained for twelve years, till 1672. During his imprisonment he wrote the first part of his immortal allegory, the *Pilgrim's Progress* (1677); though the Rev. John Brown assigns this to Bunyan's second imprisonment, of six months' duration, in 1675. During the earlier and longer imprisonment he also wrote four other books—viz. *The Holy City, or the New Jerusalem* (1665); *Grace Abounding to the Chief of Sinners*, an autobiographical and devotional narrative (1666); *Jus-*

tification by Jesus Christ (1671); and *Defence of the Doctrine of Justification* (1672). In 1671, the year before his release, Bunyan was elected pastor of the Baptist church at Bedford. In 1673 he published his *Differences about Water Baptism no Bar to Communion*; in 1680, *The Life and Death of Mr. Badman*; in 1682, *The Barren Fig-tree*; in 1684, the second part of the *Pilgrim's Progress* and *The Holy War*; in 1685, *The Pharisee and the Publican*; and in 1688, *The Jerusalem Sinner Saved*, *Solomon's Temple Spiritualized*, and *The Water of Life*. He died at Snow Hill, Holborn, and was buried at Bunhill Fields, London.

A full list of Bunyan's works was given in Charles Doe's *Catalogue Table* (1691). One of the most carefully collected editions is that entitled *The Works of John Bunyan, with an Introduction, Notes, and Sketch of his Life and Contemporaries*, by George Offor (3 vols. 1862). George Whitefield published an edition of the works in 1767, and Mason's edition, with notes, appeared in 1785. Southey's edition (1830) is one of the best, and his *Life of Bunyan* still holds its place. The Hansard Knollys Society published an exact reprint of the first edition, edited by G. Offor (1847). See also *Lives of Bunyan* by Ivimey (1809), Phillip (1839), J. A. Froude, 'English Men of Letters Series' (1880), J. Brown (1885), Edmund Venables (1888), and W. Hale White (1901).

Bunzlau, tn., prov. Silesia, Prussia, 24 m. w. of Liegnitz; famous for its brown pottery ware. Birthplace (1597) of the poet Opitz. Pop. 15,000.

Buol - **Schauenstein**, KARL FERDINAND, COUNT VON (1797-1865), Austrian diplomatist and statesman. He represented Austria at Turin (1844) and at St. Petersburg (1848), where he played

a conspicuous part in the Hungarian war, and was ambassador at London (1851). On the death of Prince Schwarzenberg, in 1852, he became Austrian prime minister, an office which he held till 1860.

Buonamacubwar, dist., N.E. Rhodesia, near the Congo frontier, 110 m. N. of Broken Hill; has great copper mines, to which the railway at Broken Hill is to be extended.

Buonaparte. See BONAPARTES, THE, and NAPOLEON.

Buonarroti. See MICHELANGELO.

Buonvincino. See MORETTO.

Buoy (Du. *loei*), a floating object intended to mark a navigable channel, to warn a vessel against submarine danger, or to serve as an anchorage. Its smallest and simplest form, an anchor-buoy, is a closed cask or block of wood fastened by a thin rope to an anchor. Cable buoys are used to buoy up cables in a rocky anchorage, so as to prevent them from being worn. Can buoys are cone-shaped, and are generally used for marking sandbanks or shallows. Of these are nun buoys. Mooring buoys are buoys strongly moored, to which vessels may make fast instead of anchoring. Buoys, as indications to pilots, were first used in the estuary of the Thames in 1538. Buoys which are marked with black and white perpendicular stripes now denote a mid-channel, and must be passed close to avoid danger. A green buoy marks a wreck. Perches with balls, cages, etc., mark turning-points in a channel. Each country has its own rules as to the meanings to be attached to the colours and other marks shown on buoys. Many buoys are fitted with bells, automatic whistles or sirens, and lights, to call the attention of ships to their neighbourhood. See Sir F. G. D. Bedford's *Sailor's Pocket Book* (1890), *Sailing Direc-*

tions, and various publications of the Hydrographic Office, London, and of Trinity House.

Buoyancy. See SHIPBUILDING, HYDROSTATICS, SPECIFIC GRAVITY.

Buprestis, a genus of beetles whose members are remarkable for the metallic brilliancy of their colouring, especially in the case of tropical forms. The colouring is chiefly present in the hard wing-covers, which are often used as ornaments. Thus, the native chieftains of S. America used formerly to string the wing-covers of *B. gigantea* together into a circlet, and use them as leg ornaments. The British representatives of the family Buprestidae are small and rare. See also SCARAB.

Buquoy, or BOUQUOY, KARL BONAVENTURA DE LONGUEVAL, BARON VON VAUX, GRAF VON (1571-1621), Austrian field-marshal, of French descent, born at Arras. Entering the service of Austria, he distinguished himself in the campaigns of the Rhine (1596-9); was defeated by Maurice of Nassau in 1600 near Nieuwpoort; laid siege to Ostend; and captured 's Hertogenbosch (Bois-le-Duc). In 1618 he commanded the imperial forces in Bohemia, successfully withstood the Bohemian emigrants and the Hungarians under Bethlen Gabor, and was wounded in the battle of the White Mountain (1621), which sealed the fate of Bohemia. He died in a further expedition against Bethlen Gabor, at the siege of Neuhausel (1621). See Weyhe-Eimke's *K. B. von Longueval Graf von Buquoy* (1876).

Bur. See BURDOCK, THISTLE.

Buran, the Jagatai Turki name for a sandstorm or snowstorm in Central Asia, though the phenomenon is not confined to that part of the world, but ranges from the Caucasus to the extremity of Siberia. The storm is swift

in its onset, the sky, in the height of the storm, the *kara buran* ('black storm'), becoming black as midnight, and the atmosphere impenetrably thick with fine sand or snow, often in the higher mountains fine needles of semi-glaciated snow, while the wind blows with terrific velocity. The less violent storm is known as a *sarik-buran*, or 'yellow storm.' Vivid descriptions will be found in Sven Hedin's *Through Asia* (1898) and *Central Asia and Tibet* (1903).

Burano, isl., Italy, 5 in. N.E. of Venice; famous for its lace. Pop. 8,000.

Burbage, JAMES (d. 1597), English actor, one of Lord Leicester's players (1574), built the first place in London (1577) specially intended for theatrical purposes, 'The Theatre' (Shoreditch). He erected later the Blackfriars Theatre (1596).

Burbage, RICHARD (?1567-1619), son of the above, became joint-proprietor of Blackfriars Theatre, and in 1599 transferred 'The Theatre' from Shoreditch to Southwark, under the name of the Globe. As an actor, chiefly at the Globe, Burbage excelled all rivals in tragedy. He filled the chief parts in Shakespearean plays (e.g. Richard III., Hamlet, Lear, Othello), in those of Ben Jonson, and of other writers. See Halliwell-Phillipps's *Outlines of the Life of Shakespeare* (1885).

Burbot, or BELPOUR (*Lota vulgaris*), a fish of the cod family, which is confined to fresh water, and is widely, though locally, distributed in Europe. It is easily recognized by the long, tapering body, the small head with a barbel on the chin, the elongation of the second dorsal and anal fins, and the small scales. In some parts of Europe its flesh is greatly esteemed as food.

Burchiello. (1404-48), Italian poet, whose real name was DO-

MENICO DI GIOVANNI, and who received his nickname from a certain portion of his poems, which deal with the most inconsistent themes, and are put together anyhow (*alla burchia*). Born at Florence, he wrote some sonnets against Cosimo de' Medici, which compelled him to leave his native city (1434). In Siena, where he led a vagrant life, his satirical writings eventually caused him to be imprisoned. He died at Rome in great poverty. Many of his sonnets deal, in a burlesque vein, with his personal affairs; others, again, are directed, in a satirical spirit, against the Siennese and against individuals in high places. The comic *genre* of this poet led to many imitations, and came to be called *burchiellesco*. The first edition of the poems appeared in 1472, and the best so far is that of Lucca and Pisa (1757, dated from London); a critical edition by V. Rossi is in preparation. A commentary was attempted by F. Doni (Venice, 1553). See Gargani's *Sulle Poesie del D. Burchiello* (1877); Mazzi's *Il Burchiello Saggio di Studi sulla sua Vita e sulle sue Poesie* (1878).

Burckhardt, JAKOB (1818-97), Swiss historian of art, born at Basel; in 1850 became professor of art history at the university of his native town. His principal work is *Der Cicerone eine Anleitung zum Genuss der Kunstwerke Italiens* (1855; 8th Ger. ed. 1901; new Eng. ed. 1879), which became a classic because of its clear and useful descriptions—it deals with sculpture and architecture as well as with painting. In *Die Kultur der Renaissance in Italien* (1860; 8th Ger. ed. 1902; new Eng. ed. 1890) he analyzes with vivid force and literary skill the circumstances which brought about the renaissance, and the special characteristics of that particular period. His other noteworthy books in-

clude *Geschichte der Renaissance in Italien* (1867; 4th ed. 1905), which deals with Italian architecture; *Die Kunstwerke der Belgischen Städte* (1842); *Die Zeit Konstantins des Grossen* (1853; 2nd ed. 1898); and *Griechische Kulturgeschichte* (ed. Oeri, 3 vols. 1898-1900). See Trog's *Jakob Burckhardt* (1898).

Burckhardt, JOHN LEWIS (1784-1817), Eastern traveller, was born at Lausanne. He came to England in 1806 with a letter of introduction from the anatomist Blumenbach to Sir Joseph Banks, through whose influence he was engaged by the African Association to explore N. Africa. Having visited (in Oriental attire, and under the name of Sheikh Ibrahim) Palmyra, Damascus, and Lebanon, he proceeded to Cairo, made two journeys to Nubia (1814), and thence to Mecca and Medina, returning to Cairo in 1816. Driven by the plague from Cairo, he visited Mt. Sinai, but returned in 1817 to Cairo, to join the Fozzan caravan to the interior of Africa. Attacked by dysentery, he died at Cairo before it started. His great collection of Oriental MSS. was left to Cambridge University. He wrote *Travels in Nubia* (1819); *Travels in Arabia* (1829); *Notes on the Bedouins and Wahabys* (1830); *Arabic Proverbs* (1830).

Burdekin, riv., Queensland; rises in Sea View range, flows by Charters Towers and Ravenswood gold fields, and falls into the Pacific Ocean at Upstart Bay.

Burden, term applied formerly to the tonnage measurement of a ship. See DISPLACEMENT.

Burden, a Scots law term signifying an encumbrance on property, either heritable or movable, secured by a legal conveyance under the hand of the person who is receiving the obligation. To be effective, the deed must contain the sum for which it is

granted and the name of the grantor, and in the case of landed property must also be recorded in the Register of Sasines. See the Land Title Acts (Scotland), 1868 and 1874.

Burder, GEORGE (1752-1832), English divine, born in London; became pastor of Congregational churches at Lancaster (1778), Coventry (1784), and Fetter Lane, London (1803). He was the chief founder of the Religious Tract Society (1799) and of the British and Foreign Bible Society (1804), and edited the *Evangelical Mag.* See *Memoirs* by H. F. Burder (1833) and Cobbin (1856).

Burdett, SIR FRANCIS (1770-1844), British politician, entered Parliament for Boroughbridge in 1796; and in 1807, by his return for Westminster—which he represented for thirty years—at the head of the poll, won the first triumph for parliamentary reform. Burdett made himself unpopular with the government by supporting vigorously freedom of speech and Catholic emancipation, as well as by protesting against the suspension of the Habeas Corpus Act, against the existing prison discipline, and against the enormous taxation. At length he was sent to the Tower for a breach of privilege. After the Reform Act of 1832 Burdett took no very prominent part in public affairs, and his opinions, like those of his friend, John Cam Hobhouse, rapidly veered towards Conservatism.

Burdett, SIR HENRY CHARLES (1847), founder and editor of the *Hospital*, and a well-known authority in hospital administration and finance. He founded the national pension fund for trained nurses and hospital officials (1888), and was secretary of the Share and Loan Department, London Stock Exchange (1883-97). He was made K.C.B. in 1897. Among his compilations are *Burdett's Official Intelligence of British,*

American, and Foreign Securities (since 1882); *Burdett's Hospitals and Charities* (annually); *The Hospitals and Asylums of the World* (1891-3); *Burdett's Official Nursing Directory* (since 1897); *How to become a Nurse* (1905); and *The Nursing Profession* (new ed. 1909).

Burdett-Coutts, ANGELA GEORGINA, BARONESS (1814-1906), daughter of Sir Francis Burdett; inherited in 1837 the great wealth of her grandfather, Thomas Coutts, a London banker. She was distinguished for the financial aid she gave to benevolent and philanthropic schemes: for instance, she organized, in 1859, the London Shoeblack Brigade, and built model lodging-houses in Nova Scotia Gardens; in 1870 she founded Columbia Market; and she established a reformatory home for women at Shepherd's Bush. The weavers of E. London, the Irish fishermen of Cape Clear, the Turkish peasantry after the Russo-Turkish war of 1877, the aborigines of S. Australia, have all received assistance from her. She effected considerable reforms in the teaching of girls at national schools, and it was she who initiated the present system of inspecting primary schools by travelling inspectors. She liberally endowed the colonial bishoprics of Cape Town, Adelaide, and British Columbia, subsidized Sir Henry James's topographical survey of Jerusalem; and gave pecuniary assistance to Rajah Brooke in Sarawak. In 1871 Queen Victoria, in recognition of her philanthropic work, conferred upon her a peerage, and in 1881 she married Mr. W. L. Ashmead Bartlett. The Baroness Burdett-Coutts edited, in 1893, *Woman's Mission*, a 'Series of Congress Papers on the Philanthropic Work of Women, by Eminent Writers' (8 vols.). She was appropriately honoured by

burial in Westminster Abbey. It was a saying attributed to King Edward VII. that the baroness was, after his mother, 'the most remarkable man in the kingdom.'

Burdett-Coutts, WILLIAM LEHMAN ASHMEAD BARTLETT- (1851), M.P. for the city of Westminster since 1885, was born at Plymouth, U.S.A. In 1881 Mr. Ashmead Bartlett married Baroness Burdett-Coutts, whose name he then assumed, and in all of whose philanthropic works and schemes he has interested himself since 1877, when he acted as her special commissioner in the distribution of her Turkish Compassionate Fund. In 1900 his allegations in the *Times* against the conduct and management of the military hospitals during the war in S. Africa led to the appointment of a commission of inquiry, and to the appointment of a committee to consider the organization of the Army Medical Department (1901). Mr. Burdett-Coutts is also a prominent advocate of railway reform, and it was due to his efforts that the government introduced the Railway (Accounts and Returns) Bill in 1910.

Burdock (*Arcium Lappa*), a plant of the Compositæ, common in temperate regions of the Old World, and naturalized in America. The flower-head, a 'bur,' is covered with small hooks, and readily attaches itself to any passing body, thus securing wide distribution of the seeds. It is used medicinally as a diaphoretic and diuretic, and in Japan is eaten as a vegetable.

Burdon-Sanderson, SIR JOHN SCOTT, BART. (1828-1905), English physiologist, was born at Jesmond, near Newcastle. In 1858 he investigated diphtheria, and in 1866 cattle plague and cholera. He was appointed physician to the Consumption Hospital, Brompton,

and the Middlesex Hospital (1860-70), and was elected first principal of Lambeth Brown Institution (1871-8), and Jodrell professor of physiology in University College, London, in 1874. In 1883 he became first Waynflete professor at Oxford, and was virulently attacked by the anti-vivisectionists, including Froeman and Ruskin. He also investigated the sensitive activity of plants and the electrical organs of the skate. He received the Royal Society's medal in 1883. From 1895 to 1903 he was regius professor of medicine at Oxford, and filled places on the Royal Commissions on Hospitals (1883), Tuberculosis (1890), and London University (1892-4). He received a baronetcy in 1899.

Burdur, or BULDUR, tn. in Anatolia, Asia Minor, 68 m. N. of Adalia, near the salt lake Burdur Göl (20 m. long). The chief industries are linen-weaving and leather-tanning. Pop. 12,000.

Burdwan. See BARDWAN.

Burdy, SAMUEL (1760-1820), born at Dromore, Co. Down, author of *A Life of Philip Skelton* (1792), a racy biography of a poor Donegal clergyman, highly praised by Macaulay.

Bure, picturesque riv., Norfolk, England. Length, 50 m. See BROADS.

Bureaucracy is a term applied to the highly-centralized forms of administration in which the officials of a department or bureau are responsible only to their administrative superiors, and are not amenable, in their official capacity, to the common law of the land. Prussia is the typical bureaucratic country, but most of the continental nations have a similar form of highly-centralized administration, with extensive powers of regulation, superintendence, and inspection over the lives and actions of the subject by officials who are respon-

sible only to the head of their own department. For bureaucracy in England, see Ramsay Muir's *Peers and Bureaucrats* (1910).

Buren. See VAN BUREN.

Burette, in chemistry, is an apparatus used in volumetric analysis to deliver accurately measured quantities of liquids. It consists of a vertical glass cylinder of uniform bore, usually graduated in cubic centimetres, and fitted with a stopcock from which any desired quantity of a solution can be allowed to flow.

Burg, tn., prov. Saxony, Prussia, 15 m. by rail N.E. of Magdeburg; the seat of important cloth manufactures, dating from the 12th century, but in part founded by French and Walloon immigrants. Pop. 24,000.

Burgage Tenure. (1.) In England, a form of tenure in boroughs by which the tenant holds of the lord of the borough by a certain rent. It is characterized by many customs, which must be strictly proved—e.g. borough English and dower. It is almost extinct. See *Coke on Littleton*, p. 108. (2.) In Scotland, the tenure of property in royal burghs. Most of the characteristics of this tenure were abolished by the Conveyancing (Scotland) Act, 1874, s. 25; and practically the only difference between burgage holding and modern feus is the existence of separate registers of sasines in the burghs where the tenure exists. See W. Green's *Encyc. of the Law of Scotland* (1896).

Burgas, tn., Bulgaria, on the Black Sea, 55 m. S.W. of Varna, connected by rail with Sofia, and in steamboat communication with Odessa and Constantinople. Exports grain, wool, tallow, butter, and rose-water. Pop. 11,000.

Burgdorf (Fr. *Berthoud*), a picturesque and ancient industrial town on the Emme, in the Swiss canton of Bern. It is 12 m. N.E. of Bern. Here Pestalozzi

established a school in 1797. It manufactures ribbons and silk, and is a depot for the Emmen-thal cheese. Pop. 9,000.

Burgee, the distinguishing pennant of a yacht club, is a V-shaped pennant, with the point away from the staff.

Bürger, GOTTFRIED AUGUST (1747-94), German poet. In 1772 he received an appointment as *amtmann* at Altengleichen, near Göttingen; this post he resigned in 1784, and became *docent* (private lecturer) at Göttingen. The title of extraordinary professor was conferred on him in 1789. Bürger admired Shakespeare, learned much from Herder's literary criticism, and found models of popular ballads in Porcy's *Reliques* (1765). He is often regarded as before all a writer of ballads. Of these, *Lenore* (1774) is the most famous; William Taylor's rendering of it had a marked influence on that of Sir Walter Scott. Other well-known ballads are *Das Lied vom braven Mann* (1776), *Der wilde Jäger* (1778), *Der Kaiser und der Abt* (1784). Bürger was one of the first to restore the sonnet to honour. There are good editions of his poems by A. E. Borger (1891), and by Grisobach (1894), who also issued his *Abenteuer des Freyherrn von Münchhausen* (1890), retold and amplified. See *Life*, in German, by Döring (1827; new ed. 1848) and W. von Wurzbach (1900).

Burger, SCHALK WILLIAM (1852), late president of the Transvaal, succeeded to that position on the flight of President Kruger from Lorenzo Marques for Europe on October 19, 1900. Mr. Schalk Burger was, up to the period of the Jameson Raid (1895-6) at all events, one of the few progressive members of the First Raad. In the war of 1880 he had invested the English garrison at Lydenburg, but failed to compel its surrender. He was (1895) chairman of the Assembly, and in 1896 was chosen a

member of the executive council. In 1897 he was chairman of the Industrial Commission, which went a long way in admitting the grievances of the Uitlanders. In 1898 Schalk Burger was an unsuccessful candidate for the presidency in opposition to Kruger. He was with Louis Botha during a portion of the Tugela operations, and was present at the battle of Spion Kop. On the death of General Joubert (March 27, 1900) he was appointed vice-president of the Transvaal. He remained in the field with Louis Botha till the end of the campaign, and was one of those who signed the terms of surrender at Vereeniging.

Burgers, THOMAS FRANÇOIS (1834-81), president of the Transvaal republic, was a minister of the Dutch Reformed Church for eight years. In 1864 he was suspended for heresy, but on appeal was acquitted. He succeeded Pretorius as president of the Transvaal in 1872, and in 1875 unsuccessfully attempted to negotiate the Delagoa Bay railway scheme in Britain and in Europe. He conducted an unsuccessful war with Secocuni in 1876, one result of which was the British annexation of the Transvaal on April 12, 1877.

Burgess. In England, since 1835, the municipal electors of a borough are the burgesses. (For burgesses before the Municipal Corporations Act of 1835, whose rights in certain respects have been preserved, see FREEMEN.) The burgesses who elect the councillors are the persons qualified under s. 9 of the Act of 1882, as amended by s. 3 of the County Electors Act, 1888. In general, they are the occupiers of houses or other buildings of any value, or of land of the annual value of £10, in the borough, who have paid rates and resided in, or within seven miles of, the borough for a year, and they include unmarried

women otherwise qualified. They are entitled to be, and must be, enrolled; and the burgess roll is the register of municipal electors. By the Honorary Freedom of Boroughs Act, 1885, the council have power to admit persons of distinction to the honorary freedom of the borough. For the City of London, see LONDON—*Government*. In the rest of London there are no burgesses. In Scotland the municipal electors may be admitted as burgesses (23 and 24 Vict. c. 47), but the register of municipal electors is not the burgess roll; and burgesses are still admitted either under the special provisions of the burgh charter, or by right of birth, apprenticeship, or marriage, or by election by the magistrates. By 39 and 40 Vict. c. 12, an attempt was made to assimilate, in some respects, the law of Scotland to that of England as regards the creation of burgesses, and it was provided that rated occupiers for three years of land or premises in the burgh should be burgesses; but this did not entitle them either to be admitted to the guilds or trade corporations, or to share in property held for behoof of their members, or in property belonging to the burgh. The magistrates admit persons of distinction as honorary burgesses.

Burgess, EDWARD (1848-1901), American yacht-designer, was born at West Sandwich in Massachusetts. He began designing yachts at Boston in 1883, and designed in succession three successful defenders of the America Cup—viz. the *Puritan* (1885), the *Mayflower* (1886), and the *Volunteer* (1887).

Burgess, JOHN BAGNOLD (1829-97), English painter, was born in Chelsea, and studied at the Royal Academy schools (1851). For thirty years he visited Spain annually, and is specially noted for his treatment of subjects in

Spanish life. His best works are *Bravo Toro* (1865); *The Letter-writer* (1882); *The Meal at the Fountain: Spanish Mendicant Students* (1883); *Rehearsing the 'Miserere, Spain* (1894). He became A.R.A. in 1877.

Burgess Hill, tn., Sussex, England, 9 m. N. of Brighton; manufactures bricks and tiles. Pop. 5,000.

Burgh (Scotland). There were formerly in Scotland, in the words of Skene, 'three kinds of burghs—burghs of barony, burghs of regality, and royal burghs. Burghs of barony are such as the baron hath full power to choose their bailies; burghs of regality are such as the lord of the regality hath full power to choose their bailies; royal burghs are so called because they hold immediately of the king'—i.e. a royal burgh was created by a charter from the king, and the charter usually conferred on the inhabitants the right to elect its officers, but their rights gradually fell into disuse. The reform of these 'close corporations' was carried out by an Act of 1833, and the election of magistrates and councillors was again put into the hands of the inhabitants. Latterly two new classes of burghs have arisen—(1) parliamentary burghs, which, either separately or along with other burghs, return a member to Parliament; (2) police burghs—i.e. populous places which may, by authority of the sheriff, adopt the Police Acts, and which are governed in practically the same way as royal and parliamentary burghs, except that they have no special licensing authority, but are under the county licensing courts. See *Burgh Government* (1905); also BAILIE, LOCAL GOVERNMENT, PROVOST.

Burghers. See SECESSION CHURCH.

Burghersdorp, tn., Albert dist., Cape of Good Hope, 243 m. by rail N.W. of E. London. It was

in Boer hands for the first six months of the S. African war. Pop. 3,000.

Burghley, WILLIAM CECIL. See BURLEIGH.

Burghs, CONVENTION OF, a yearly meeting of the commissioners of royal burghs in Scotland, held in Edinburgh. The convention, which dates back to 1487, has now lost much of its importance through municipal and parliamentary representation and extension of local government.

Burgin, GEORGE B. (1856), novelist and journalist. He accompanied Baker Pasha to Asia Minor as secretary of the Reform Commission in Armenia. He has written, among other novels, *The Way Out* (1900), *A Son of Mammon*, *A Goddess of Gray's Inn* (1901), *The Shutters of Silence*, *The Ladies of the Manor* (1903), *The Land of Silence*, *The Hermit of Bonneville* (1904), *Devil's Due* (1905), *A Simple Savage* (1908), and *The King of Four Corners* (1910).

Burgkmair, or BURCKMAIR, HANS (1473-1531), German painter and engraver, born at Augsburg. His early German style is well represented by the portrait of himself and wife in Vienna; his later more Italian style by the *Adoration of the Kings* in Augsburg. His great reputation rests on his woodcuts, which rank high for their dramatic force and ingenuity, and for their truth to the life of his time. Among the most important of his engravings are *The Triumph of Maximilian* (135 prints) and the *Genealogy of the Emperor* (237 prints); also 52 plates for the *Book of the Tourney*, and 104 designs for a German translation of the *Offices of Cicero*, and 200 for the German translation of Petrarch's *Fortune*. See Wilmot Buxton's *German, Flemish, and Dutch Painting* (1881).

Burglary is the breaking and entering a dwelling-house between

9 p.m. and 6 a.m. with intent to commit a felony. The breaking may be either actual (e.g. forcing open a closed window or door) or constructive (e.g. gaining admission by conspiracy with a servant). The entry of the smallest portion of the person, such as a hand, is enough. The breaking and entering may be by different persons acting together, and may be on different nights. A burglar is liable to penal servitude for life. Entering a house by night without breaking, with intent to commit a felony, is punishable with seven years' penal servitude. Being found by night (a) armed, or (b) with housebreaking implements, or (c) in a dwelling-house, coupled in each case with felonious intent, is a misdemeanour punishable with five years' penal servitude. Housebreaking is the same as burglary, except that it may be by day, and the breach may be of any building, not necessarily a dwelling-house. It is punishable with fourteen years' penal servitude, and the attempt with seven years'. In Scots law, the offence is housebreaking with intent to steal, and it is the worst aggravation of theft. There is no distinction between day and night, or between a dwelling-house and other closed buildings. See Stephen's *History of Criminal Law* (1883) and Russell's *Treatise on Crimes and Misdemeanours* (1909). See also HOUSE.

Burglary Insurance. See INSURANCE.

Bürglen, vil. in the Swiss canton of Uri, at the entrance to the Schächenthal, and $1\frac{1}{2}$ m. s.e. of Altdorf. It is the supposed birthplace of William Tell. Pop. 1,700.

Burgomaster, the chief magistrate in Belgian, Dutch, German, and Austro-Hungarian towns.

Burgon, JOHN WILLIAM (1813-88), British ecclesiastical writer,

was born at Smyrna. From 1863-76 he was vicar of St. Mary the Virgin, Oxford; from 1868-75, Gresham professor of divinity; and in 1876 he was appointed dean of Chichester. He wrote a large number of treatises on ecclesiastical questions, from the point of view of a conservative of the Low Church type. Among his works are *Life and Times of Sir Thomas Gresham* (1839), *Oxford Reformers* (1851), *Historical Notices of the Colleges of Oxford* (1855), *Letters from Rome* (1862), *The Athanasian Creed* (1872), *The Revision Revised* (1883), and *The Lives of Twelve Good Men* (2 vols. 1888). See *Life* by Goulburn (1892).

Burgos. (1.) Province, N. Spain, lying between Alava and Navarre. On the whole the province is mountainous, but especially in the N. and N.E. To the s. lies the table-land of Old Castile. In the E. rises the lofty peak of Cerro de San Millán (6,995 ft.), while in the extreme s. is the pass of Pancorbo. The soil is generally poor, but the plains produce cereals and vines; fine merino sheep are raised on the pasture lands; coal, lignite, iron, copper, silver, and lead are found. The chief rivers flowing through the province are the Ebro, for 62 m.; the Douro, for 37 m.; the Pisuerga; and the Arlanzón. There are potteries, stone quarries, and factories for linen and cotton. Want of railways and of good roads has militated very much against development. Area, 5,480 sq. m. Pop. 340,000. (2.) City, cap. of above prov., on riv. Arlanzón. It stands on the Northern Ry., 142 m. N. of Madrid, was the early capital of the rulers of Castile, and afterwards it shared with Toledo the honour of being the royal residence. Its principal glory now is its superb Gothic cathedral (1221), which is one of

the noblest in the world. The castle (now in a ruined condition) was besieged by the British in 1812, and surrendered in 1813. The fortifications were destroyed by the French (1813). The Cid Campeador, the local hero, is buried here. The monastery of the Cartuja and the historical nunnery of Las Huelgas, in the neighbourhood, are of the highest interest. Burgos is an archbishop's see. It is the centre of a wheat-growing district, and there is some industry in leather, cloth, and hosiery. Pop. 30,000.

Burgoyne, JOHN (1722-92), English soldier and dramatist. Entering Parliament in 1768, he criticised the War Office and foreign policy, and by his political career won favour at court. Burgoyne is remembered for his American expedition (1774-7), the failure of which, though due to the incapacity of others, made him for a time very unpopular. He also wrote dramas—as, *The Lord of the Manor* (1780), and *The Heiress* (1786), described by Horace Walpole as one of the most pleasing domestic compositions. See his *Works* (2 vols. 1808); 'De Fonblanque's *Political and Military Episodes of John Burgoyne* (1875); and Bernard Shaw's play, *The Devil's Disciple*.

Burgoyne, SIR JOHN FOX (1782-1871), R.E. officer, illegitimate son of the above, rendered important services while commanding the engineers in Portugal (1809-13) and in America (e.g. at Fort Bowyer), and as virtual second in command in the Crimean war. For his Crimean work Burgoyne was assailed by the press, but later became a popular hero, and was made baronet and field-marshal. See his *Life and Correspondence*, by Hon. G. Wrottesley (2 vols. 1873); Sir J. T. Jones's *Journal of the Sieges..... in Spain* (1814); A. H. Kinglake's *Invasion of the Crimea* (1899).

Burgrave, or **BURGGRABE**, a title frequently borne in the middle ages by the military commandant of a German town. He was appointed by the emperor or by a bishop of the empire. There were burgraves of Nuremberg, Augsburg, Meissen, Regensburg, Magdeburg, and other towns. The title subsequently became hereditary in certain noble families—e.g. that of Brandenburg.

Burgstadt, tn., Saxony, 9 m. N.W. of Chemnitz; manufactures gloves, boots, hosiery, cottons, etc. Pop. 7,300.

Burgsteinfurt, tn., Westphalia, Prussia, 18 m. N.W. of Münster. Pop. 5,500.

Burguillos, comm., Spain, prov. of and 40 m. S.E. of Badajoz. Pop. 5,800.

Burgundii, a powerful German tribe whose original home was between the Oder and the Vistula; they were of the same race as the Vandals. The Gepidæ drove them from their first habitations into the country about the Main. Early in the 5th century A.D. the usurper Jovinus invited them to settle on the left bank of the Rhine; hence arose the duchy and county of Burgundy.

Burgundy (Fr. *Bourgogne*), former province of France, now forming all or part of the departments Ain, Aube, Côte-d'Or, Haute Marne, Nièvre, Saône-et-Loire, and Yonne. The Burgundians invaded the country with the Vandals, 410 A.D., but were vanquished by the Franks in 523, and again became independent in the 9th century. The struggle for supremacy in France between the Burgundians, the French, and the English fills an important chapter of mediæval history. In 1477, on the death of its last duke, Charles the Bold, Burgundy was attached to the crown of France. The name is now mainly associated with the wine of the province. The finest wine is grown

on the slopes of hills in Côte-d'Or, and is celebrated for its rich flavour. It is divided into three classes—the wines of Basse Bourgogne (Chablis, Montrachet, etc.), Haute Bourgogne (Clos-Vougeot, Chambertin, Corton, Pommard, and Volnay), and the Maconnais and Beaujolais. The annual yield of the vineyards is about $4\frac{1}{2}$ million gallons.

Burgundy Pitch is prepared by melting and straining the exudation from the stem of the spruce fir. It is hard, brittle, reddish brown and opaque, sweet, and aromatic. It is soluble in glacial acetic acid, by which the common adulterants can be detected, and is used as a basis for plasters, having a stimulating action on the skin.

Burhanpur, tn., Nimar dist., Central Provinces, India, 270 m. N.E. of Bombay; was the seat of the Deccan princes of the Mogul empire until 1635; was taken by General Wellesley in 1803; and in 1860 became British territory. It contains the remains of a palace built by Akbar, and a mosque by Aurungzebe. Fine cottons and brocaded silks are manufactured. Pop. 34,000.

Burial, LAWS OF. In England every baptized person not a suicide, excommunicate, or a murderer, is entitled at common law to be buried in the churchyard of his parish by a Church of England clergyman, without fee. The baptism may be of a kind recognized by any Christian sect. Before 1823, one who had committed *felio de se* was buried at cross roads with a stake through his body, on a coroner's warrant; but now, by the Interments (*Felio de se*) Act, 1882, he may be buried, even by a clergyman of the Church of England, with any service other than the burial service of the Church of England. Murderers in the United Kingdom are buried in the prison where they are

hanged. The duty of burying the dead rests primarily on the executor. A husband is liable for a wife's burial, and a father for a child's; while, in default of any one else, a householder is bound to provide for the burial of a person dying in his house. Guardians of the poor may bury a pauper if no one else is liable to do so, and must bury those dying in their institutions, as well as drowned bodies left by the tide (Drowned Persons Interment Acts, 1808 and 1886); and in Scotland, under the Public Health Acts, the local authority is bound to bury any unclaimed body. Under the Infectious Diseases Act, 1890, persons dying of infectious diseases must, under certain circumstances, be buried, or removed to a mortuary, within forty-eight hours. Similar provisions as to Scotland are contained in the Public Health (Scotland) Act, 1897, and as to London in the Public Health (London) Act, 1891. It is not larceny to steal a dead body, but it is an offence to remove a body when buried, except under a faculty or an order of the Home Secretary (Burial Act, 1857). A coroner may order the exhumation of a body. The parson is the freeholder of the churchyard on trust for the parishioners, and he may not bury non-parishioners without the consent of the churchwardens, nor erect or remove a vault or tombstone without a faculty. By the Burial Acts, 1852 and 1853, churchyards can be closed by order in council. No building can be erected on a closed burial ground (Disused Burial Grounds Act, 1884), though it may be conveyed to the local authority as an open space (Open Spaces Act, 1906). Although a parson is not entitled to any fee for burials or for the erection of tombstones at common law, such fees may be due by custom if reasonable

and certain in amount. Under the Burial Acts, 1852 to 1906, the opening of new burial grounds in cities may be forbidden by order in council. These acts provide means for the establishment of burial boards. A burial board may be a town council, an urban district council, or a parish council. It may buy land for a graveyard, and divide it into consecrated and unconsecrated ground; but by the Act of 1900 it need not consecrate any part unless required by a reasonable number of inhabitants. Since 1880 a clergyman has been authorized to perform burial in unconsecrated ground, and a layman to bury in consecrated ground, with or without service. Burial boards may, by the 1900 Act, build undenominational chapels at their own expense, and denominational chapels at the expense of the denomination. Formerly a Church of England chapel might be built at the board's expense. Boards may alienate vaults in perpetuity. The thorny question of fees has been settled by the Burial Act, 1900. Fees in the consecrated and unconsecrated portions of a burial ground are to be the same, and to be payable to ministers irrespective of denomination, and to be approved by the Secretary of State. Fees to incumbents for monuments are abolished, but the rights of present incumbents are preserved, and no alteration is to be made in any event for fifteen years from 1900. Burial boards cannot appoint a chaplain; and a parson's liability to bury his parishioners remains unaltered. Unconsecrated burial grounds cannot be used for any other purpose without leave of the Local Government Board. In addition to public graveyards, there are many private cemeteries established by private act, and mainly governed by the Cemeteries Clauses Act, 1847.

Local authorities may also provide cemeteries under the Public Health (Interments) Act, 1879. In Scotland there are no restrictions as to the places in which persons may be buried, and such places are regarded as sacred. The heritors are bound to provide and, if necessary, enlarge kirkyards for the parishioners generally; but by the Local Government (Scotland) Act, 1894, they may transfer the kirkyard to the parish council. Public burial grounds may be provided, under the Burial Grounds (Scotland) Acts, 1855-1886, by the local authority (which, except in burghs, is the parish council), on a requisition by two councillors or ten ratepayers. Kirkyards injurious to health may be closed either under the Public Health (Scotland) Act, 1867, or by the Secretary for Scotland under the Burial Grounds (Scotland) Act, 1855. See Baker, *On Burial Laws* (6th ed. 1901); also CEMETERY and CREMATION.

Burial Customs. Although burial strictly means interment, or, at any rate, conveys the idea of covering over, a brief mention may here be made of the various modes of disposing of the dead, whether under ground or otherwise. Probably the method still followed by the Siberian Chukchis, by some tribes of Eskimos, and by the Tibetans, as described by Sven Hedin, was that first practised by man—viz. carrying the corpse a short distance from the encampment, and there leaving it to be devoured by dogs or vultures. Similarly, the Masai, the Wakamba, and other African tribes deliberately leave the bodies of their dead to be food for the hyænas. Equally callous is the Mashona treatment of criminals; for although the command of a chief—'Throw him to the crocodiles,' or 'Give him to the hyænas'—is interpreted in the



Egyptian Burial Ceremonies.

(By permission, from the large facsimile sheets of the *Book of the Dead*, published by the Department of Oriental Antiquities, British Museum.) The upper part shows the mummy on a boat-shaped bier drawn by oxen, the wife kneeling beside it, and a priest officiating in front. In the lower part the mummy is supported upright in front of the tomb by Annis, the wife again kneeling; priests officiate at a table of offerings—one reads the burial service, and one brings forward an offering; behind are mourners. The cow and calf symbolize the Rising Sun, and Heaven.

first place as an order for immediate death by a spear or a club, yet it also indicates the ultimate destiny of the corpse. The Hindu practice of committing the dead to the waters of the sacred Ganges had probably a like origin, although latterly accompanied by the most reverent rites. The same may be said of burial at sea, which, in certain phases, was nothing more than the getting rid of a corpse by tossing it overboard, but which, as practised nowadays, is a solemn and devout ceremony. Akin to these is the Malay usage, by which a man, recognizing the near approach of death, puts out in his boat alone to sea; which bears some resemblance to the Viking (Vik-man, or Scandinavian sea-rover) practice of putting a corpse aboard a ship which was set on fire, though the more usual custom was to bury it under the warrior's ship, or to build a mound over it on some sea headland. The Parsee custom is to expose the corpse on a tower, there to have the flesh devoured by vultures, thus avoiding the greater horror of putrefaction. Analogous, but not obviously with the same aim, is the method, followed by the Siberian Yakuts and the Canadian Siccanees, of placing the dead in a covered coffin, which is then hung up between two trees. Cremation, once more coming into vogue, was formerly a widespread practice, and urns containing incinerated remains are frequently disinterred in many parts of Europe. Burial in the earth, in mounds, and in stone vaults has been, and with little variation still is, the most usual European form of sepulture. These latter modes of burial ought perhaps to be regarded as a development of the practice among mound-dwellers of leaving the body of the deceased within the mound that had once been his house, and closing the entrance.

In the Alcutian Isl^{nds} it was customary to close merely that compartment which had been the dead man's special retreat, while his kinsfolk continued to inhabit the other parts of the mound-dwelling as before. (See Lord Avebury's *Prehistoric Times*, 1900, pp. 124-129.) Similar in nature is the hut-burial of the Maoris and of various tribes in Africa and S. America. In some cases the corpse is merely buried underneath the floor of the hut; in other cases the door is closed, and the hut becomes a tomb. Among primitive nations it was often the custom to place beside the corpse his weapons and utensils, for use in the other world; and in the case of a chief, his wives, slaves, and steed were killed at his grave, that they might bear him company, and serve him as in this life. Faint traces of such usages still survive in the customary British ceremonial at the funeral of an officer. The Hindu *sati*, or *suttee*, is another illustration of this idea. As a rule, corpses are and have been buried lying at full length; but in many early European and in modern Eskimo interments the body is doubled up. Embalming for purposes of preservation was the process adopted by the ancient Egyptians, and in a modified form it persists to the present day. *Endocannibalism* (see CANNIBALISM) may also be regarded as a burial custom.

Burial Societies. See FRIENDLY SOCIETIES.

Burian, STEPHEN, BARON OF RAJECZ (1851), a Hungarian of Slovak descent; he became imperial finance minister for Austria-Hungary and administrator of Bosnia-Herzegovina in 1904. From 1897-1904 he was minister to Greece. He is an authority on the Balkan question.

Buriats, a Mongol race inhabiting the district round Lake Baikal, Transbaikalia, and the south of

government of Irkutsk, in Siberia. Originally nomads, they are now in part successful agriculturists. A sluggish, harmless race, they are really adherents of Shamanism, though they profess Lamaist Buddhism. They are estimated to number about 210,000.

Buridan, JEAN, a French philosopher of the 14th century, became rector of the University of Paris (1327). He was one of the most subtle dialecticians of his age, and his works consist of commentaries on Aristotle (1447-9 and 1518). 'Buridan's ass' is a phrase well known as an argument in illustration of free will. It supposes the case of an ass standing equidistant between two bundles of hay, and finding difficulty in making choice of either. His works were published by J. Dulard in 1516.

Buriti Palm (*Mauritia flexuosa* or *vinifera*), two of the largest S. American fan palms (100-125 ft. high), growing on swampy land from S. Brazil to the W. Indies. From the sap the natives obtain, by fermentation, an intoxicating liquor; and the pulp of the fruit is eaten, and is preserved in sugar. The leaf fibres are used for cords, mats, etc., the pith as cork, and the stem yields a kind of sago.

Burke, EDMUND (1729-97), statesman and political philosopher, was born at Dublin on Jan. 12, 1729. In 1756 he published the *Vindication of Natural Society*, a satire upon Bolingbroke; and the *Philosophical Inquiry into the Origin of our Ideas of the Sublime and the Beautiful*, an important contribution to the study of aesthetics. When in 1759 Dodsley founded the *Annual Register*, Burke, to whom the plan of the book was due, became its editor, and remained a contributor until 1788. In 1761 he accompanied W. G. Hamilton ('Single Speech') to Ireland. 'Whiteboyism' was then breaking out,

and Burke sketched a fragment on the Irish penal laws. He always advocated a generous policy towards Ireland and her religion. On his return to London (1763) he mixed in literary society, and made lasting friendships with Johnson and other members of the Literary Club, to which he was himself admitted in 1764. His public life now began. Lord Rockingham, the chief of the remnant of the old Whig party, was called to office, and Burke became (1765) his private secretary. At this time Parliament was controlled by the 'king's friends,' a body of men who stood outside the old party groups, and in effect represented the parliamentary influence of the crown. They acted under the royal orders, and were able for a time to make the king's will supreme. The disturbances arising out of the election of Wilkes for Middlesex (1768), and his rejection by the House of Commons, marked the extent of the evil; and in *Thoughts on the Cause of the Present Discontents* (1770) Burke denounced the system, and demanded a return to regular party government. Then a greater problem tested his powers as a statesman and political theorist. His sane and generous views on the rebellion of the American colonies, and the disastrous policy of the ministry of Lord North (1770-82), found expression in his speeches on *American Taxation* (1774) and on *Conciliation with America* (1775), also in the *Letter to the Sheriffs of Bristol* (1777). In their union of sound statesmanship and lasting political wisdom these treatises form 'the most perfect manual in our literature for one who approaches the study of public affairs, whether for knowledge or for practice' (Morley's *Burke*). In 1774 he exchanged the constituency of Wexford, which he had represented

since 1765, for that of Bristol; but his independent attitude in regard to the restrictions on Irish trade and the relief of Catholics cost him the seat in 1780, and after that he sat for Malton (1780-94). In 1780 he brought forward his *Plan of Economical Reform*, designed to check extravagance in the administrative departments, and to abolish certain sinecures which supported the corrupt influence of the crown. Two years later Lord Rockingham returned to power, and Burke became paymaster-general; but in three months the ministry was dissolved by the death of Rockingham. Burke and Fox refused to serve under his successor, Lord Shelburne, and by an alliance with their old enemy, Lord North, formed the coalition ministry (1783) under the Duke of Portland, in which Burke was again paymaster-general. The defeat of the ministry (Dec. 1783) on Fox's, or rather Burke's, East India Bill closed Burke's brief tenure of office. (He was never in the cabinet.) His eloquent speech on the East India Bill was the prelude to his great crusade against the abuses of the E.I.C. The speech on the *Nabob of Arcot's Debts* (1785), and the orations which were crowned with the impeachment of Warren Hastings (1788), reveal his profound knowledge of India and his acute sensibility to her wrongs. The same reverence for established faiths and institutions urged him to write *Reflections on the French Revolution* (1790). In the proceedings of the National Assembly he saw a revolt against law and order which seemed to him to threaten an upheaval of the entire political systems of Europe. The publication of the *Reflections* proved to be an event of European importance, but in the Whig party it created a painful division, which was accen-

tuated by the *Appeal from the New to the Old Whigs* (1792). Burke broke off his friendship with Fox, and severed the political ties of a lifetime, but he carried with him a number of the Whigs. His hatred of the revolution grew almost to frenzy, and in the four *Letters on a Regicide Peace* (1796) sobriety and good taste gave place to violent declamation. In retiring from Parliament in 1794 he was granted pensions amounting to £3,700 a year, which his lifelong pecuniary troubles made welcome. He died on July 8, 1797, and was buried at Beaconsfield, in Bucks. As an orator, Burke was too discursive and profound to be popular. His writing, however, is essentially rhetorical, and his greatness lies, as Johnson says, in his 'copiousness and fortility of allusion,' splendour of imagination, and pregnancy of phrase. The union of justice and freedom, are to him the great ends of statesmanship. But he failed to appreciate the social phenomena which underlay the revolution, and in his respect for the past he was too apt to forget the abuses of the present. Among his other works are: *Hints for an Essay on the Drama* (c. 1765), *Account of the European Settlements in America* (1757), *Abridgment of Eng. Hist.* (1757), *Observations on the Present State of the Nation* (1769), *Address to the King* (1776), *Two Letters to Gentlemen in Bristol* (1778), *Letter to a Member of the National Assembly* (1791), *Observations on the Conduct of the Ministry* (1793), *Remarks on Policy of Allies* (1793), *Report on the Lords' Journal* (1794), *Thoughts and Details on Scarcity* (1795), *Letter to a Noble Lord* (1795). A collected edition of his works was begun in 1792 and finished in 1827; *Works and Correspondence* (8 vols. 1852); *Select Works*, Payne (3 vols. 1874-8), notable for its excellent intro-

ductions; *Letters, Tracts, and Speeches on Irish Affairs*, Matthew Arnold (1881); *Life*, by Sir J. Prior (1824); *Burke: a Historical Study* (1867), by John Morley, and also his *Burke* ('English Men of Letters,' 1879); *Life*, by G. Chadwick (1902); and Macaulay's *Essay on Warren Hastings* (1841).

Burke, JOHN (1787-1848), Irish genealogist, was born in Co. Tipperary, Ireland. In 1826 he first published his *Peerage*—a genealogical and heraldic dictionary, an edition of which appears every year. See *Burke's Landed Gentry*, s.v. 'Burke of Elm Hall.'

Burke, SIR JOHN BERNARD (1815-92), genealogist, second son of the above, was born in London, and called to the bar of the Middle Temple in 1839. He succeeded Sir J. Betham as Ulster king-of-arms (1853), and was knighted in 1854. Sir Bernard Burke edited for many years, in succession to his father (1847), the annual issue of the *Peerage*; and his most interesting works include *History of the Landed Gentry* (1843-9), *Family Romance* (1853), *Vicissitudes of Families* (1859), *Rise of Great Families* (1873).

Burke, ROBERT O'HARA (1820-61), Australian explorer, was born in Co. Galway, Ireland; the leader of an expedition across the Australian continent which left Melbourne in August 1860. Disensions early arose, and at Cooper's Creek several members returned; but Burke and Wills pushed on, and reached the tidal waters of the Flinders R. They died of starvation on their way back, but had achieved the distinction of being the first white men to cross Australia from south to north. See *Burke and Wills's Exploring Expedition* (1861).

Burke, THOMAS HENRY (1829-82), son of William Burke of Co. Galway, was successively private secretary to Sir Thomas Redington, Edward Cardwell, Sir Robert

Peel, and Lord Carlingford, and was appointed under-secretary for Ireland (1869). In 1882 he and Lord Frederick Cavendish, chief secretary, were murdered in Phoenix Park, Dublin, by Carey, Fitzharris, Brady, and other members of the Irish Invincibles.

Burke, WILLIAM (d. 1798), born in London, was a kinsman of Edmund Burke, whom he assisted with the *Account of the European Settlements in America* (1757), and in 1759 came into notice by his *Remarks on the Letter to Two Great Men*—a reply to Lord Bath's letter to Pitt and the Duke of Newcastle. In 1765 he was made an under-secretary of state, but resigned the following year. He was member for Great Bedwin, Wiltshire, from 1766-74. Ruined by speculation in 1769, he went in 1777 to India, where he held several important appointments. He returned to England in 1793. Attempts have been made to prove his authorship of the letters of Junius. See Morley's *Edmund Burke*, MacKnight's *Life of Edmund Burke*, Walpole's *Memoirs of the Reign of George III.*, and Almon's *Anecdotes*.

Burke, WILLIAM (1792-1829), the accomplice of William Hare in the Edinburgh murders, was born at Orrery, Co. Cork, Ireland. In 1827 he lived in Tanner's Close, Edinburgh, in a lodging-house kept by Hare. The two men used to inveigle wayfarers into their house, make them drunk, and then suffocate them in such a manner as to leave no sign of violence on the bodies (this has subsequently been known as burking), with the object of selling them (for £8 to £10) for dissection to Dr. Robert Knox. Suspicion having been aroused, Burke and Hare were arrested; the latter turned king's evidence, and Burke was executed. See MacGregor's *History of Burke and Hare* (1884).

Burkhan-Buddha, a Tibetan mountain range, often regarded as the central section of the E. Kuenlun system, reaches an elevation of over 16,000 ft., and runs for more than 120 m. along the north edge of the Tibetan plateau in about 36° N. lat. See KUENLUN MOUNTAINS.

Burlamaqui, JEAN JACQUES (1694-1748), Swiss jurist, member of a family from Lucca that found refuge at Geneva. After travels in England and France, he became professor of law and magistrate at Geneva. His chief work, which had a great vogue, especially in England, was put into the *Principles of Natural Law* (2 vols. 1748-52), this being the English version (by Nugent) of *Principes de Droit Naturel* (1747) and *Principes de Droit Politique* (1751). A complete edition of his works appeared under the title *Principes du Droit de la Nature et des Gens* (8 vols. 1766-9; new ed. 5 vols. 1820). See Life in Senebier's *Histoire Littéraire de Genève* (1786).

Burleigh, BENNET, British war correspondent, was born in Glasgow. He fought in the American war, and was twice sentenced to death, and since 1882 has been on the staff of the *Daily Telegraph*. He was war correspondent during the first Egyptian war (1882), the French campaign in Madagascar, the desert campaign from Korti to Metammah, the Ashanti, Athara, and Omdurman expeditions. His dispatches from S. Africa during the Boer war (1899-1902) were trustworthy and interesting. He acted as correspondent during the Russo-Japanese war. He published *Empire of the East* (1905).

Burleigh, or BURGHLEY, WILLIAM CECIL, LORD (1520-98), an English statesman, was born at Bourne, in Lincolnshire, the son of a wealthy squire. In 1547 the Protector Somerset made him master of requests, and subsequently his secretary; but

when Somerset fell, Burleigh was imprisoned for two months in the Tower. His merits were so conspicuous, however, that in 1550 he was appointed secretary of state, and shortly afterwards knighted. His domestic policy was salutary and enlightened. He assented to, without approving, Northumberland's scheme for altering the succession; and when Mary came to the throne he conformed to the Catholic religion, and became friendly with Cardinal Pole, although remaining at heart a Protestant. Consequently, on the accession of Queen Elizabeth, he was appointed chief secretary of state; and from 1558 till his death he practically guided the destinies of England. It was largely owing to Burleigh's sagacity that the reign of Elizabeth was so illustrious. In 1560 Burleigh went to Scotland as commissioner to end the war. His foreign policy was anti-Spanish. He desired to form a Protestant confederacy against the Catholic powers. The execution of Mary Queen of Scots he ceaselessly advised, as absolutely necessary for the safety of his own sovereign and country. He was created Baron Burghley in 1571, and (1572) Lord High Treasurer, which post he held until his death. He was buried in Westminster Abbey. From his eldest son came the Exeter branch of the Cecils, and from his second son the Salisbury branch. See the *Burghley Papers*, edited by Murdin (1759); the *Historical* of Froude and Lingard; Macaulay's *Essay* (1889); Camden's *Annals and Hist. of Elizabeth* (1635); the *Calendar of State Papers*; E. Nares's *Memoirs of Lord Burghley* (1828-31); M. A. S. Hume's *The Great Lord Burghley* (1898); and A. Jessopp's *William Cecil, Lord Burghley* (1904).

Burlesque (from Ital. *burla*, 'mockery', 'jesting'), a composi-

tion treated in a way to excite laughter. The usual method is to set forth the subject in a ludicrous light, by emphasizing its incongruities, its oddities, its inconsistencies; but burlesque differs from satire in that it is neither inspired nor shaped by moral condemnation or *sarva indignatio*. Burlesque is closely allied with *burlatta*, a comic opera interspersed with songs, corresponding with the entertainment styled in France a *vaudeville*. Although pure burlesque originated in the time of Aristophanes, modern burlesque, so called, was practically an Italian invention, its two greatest exponents being Berni and Giozzi. The best of English burlesques, far behind those of Italy, are Chaucer's *Rime of Sir Thopas*, Beaumont and Fletcher's *Knight of the Burning Pestle*, Buckingham's clever ridicule of the contemporary play-writing entitled *The Rehearsal*, Smith's *Rejected Addresses* (burlesques on the opening of Drury Lane Theatre, supposed to be written by famous writers of the time), and Butler's *Hudibras*. Scarron is perhaps the most distinguished French writer in this vein. The best burlesque ever written is the *Don Quixote* of Cervantes. There is a distinct note of burlesque in the comic operas of Sir W. S. Gilbert. Burnand's burlesques (*Strapmore, The Colonel, Black-eyed Susan*) also deserve mention here. One of the varieties of burlesque is parody, a favourite form of modern literary composition. See Hamilton's excellent collection of *Parodies*; Adams's *Book of Burlesques*; and *Burlesque Plays and Poems*, in Morley's 'Universal Library.'

Burlingame, ANSON (1820-70), American diplomatist, was born in New York State, and practised as a lawyer in Boston. He was sent by Abraham Lincoln to China as ambassador (1861); and on his return (1867) Prince Kung, regent

of the empire, requested him to act as special Chinese envoy to the United States and the great European powers. His success was marked by the treaty (1868) in which China first officially accepted the principles of international law. He died in St. Petersburg.

Burlington. (1.) City, Iowa, U.S.A., the co. seat of Des Moines co., on the Mississippi, 166 m. N. by W of St. Louis. It is the seat of Burlington University, and is a prosperous manufacturing town and an important railroad centre. Pop. 24,000. (2.) City and port of entry, Burlington co., New Jersey, U.S.A., on Delaware R., nearly opposite Bristol, 20 m. N.E. of Philadelphia; seat of Burlington Episcopal College. The city has an extensive industry in garden and dairy produce, and manufactures boots and shoes. Pop. 8,000. (3.) City, Vermont, U.S.A., the co. seat of Chittenden co.; situated on the E. shore of Lake Champlain, 36 m. W.N.W. of Montpelier. It has an extensive commerce, especially in Canadian lumber; also valuable marble and stone quarries, and a great variety of manufactures. It is the seat of the University of Vermont (1791), and the State Agricultural College is also situated here. Pop. 21,000. (4.) See BRIDLINGTON.

Burlington House, in Piccadilly, London, was erected about 1665. The Royal Academy, in March 1867, acquired a lease of it, and of a portion of the garden behind. Exhibition galleries and schools were built on the garden site, and opened in 1869, further additions being made in 1884. In the upper story which was then added to the old house, diploma works, the Gibson statuary, and other works of art are stored. The new wings of Burlington House, built and owned by the government, are now the head-

quarters of the following societies: Royal (since 1857), Antiquarian, Astronomical, Linnean, Chemical, and Geological.

Burlus, LAKE, a shallow lake in the Nile delta, E. of Rosetta, Egypt; it is 40 m. long by 16 m. wide. It abounds in fish.

Burma, an important adjunct of the British Indian empire, is bounded on the N. by Assam and China; on the E. by Chinese territory, Annam, and Siam; on the S. by Siam; the Bay of Bengal forms the W. boundary, except at the N.W. corner, where the province touches the petty states of Tipperah and Manipur. Burma covers an area of about 236,500 sq. m., including the native states, or without them of about 168,500 sq. m. A semicircle of mountain ranges marks the N. frontier, and the country is intersected by hills which trend generally N. and S. On the S.W. are the Arakan (with the Blue Mountain at the N. extremity) and the Tenasserim hills. Parallel with the Arakan hills is the range of mountains called the Pegu Yoma. The two principal rivers are the Irawadi and the Salwin. The former, navigable beyond Bhamo, about 900 m. from the sea, traverses the valley of the Arakan and Pegu Yoma, spreads itself into a gigantic delta, and finds an outlet in the Bay of Bengal. The latter flows into the Gulf of Martaban. Most of the other fertilizing streams of Burma also flow S. The coast-line is much indented, and is studded with islands (Mergui Archipelago, etc.).

There can be no doubt as to the vastness of Burma's mineral resources. Petroleum is found on the banks of the Irawadi. There are important amber mines and marble quarries. In the ruby mines, situated about 60 or 70 m. from Mandalay, some of the finest specimens of these precious stones have been found.

Gold, silver, and coal have been discovered in the country towards the N.E., but are not yet exploited. Forests cover an area of nearly 29,000 sq. m.; a long way the most valuable timber is teak. Rice forms the staple food of the inhabitants, and large quantities are exported. Other important products are wheat, cotton, and tobacco. Total exports reach £9,000,000, and imports £8,000,000 per annum. The rivers teem with fish and aquatic birds. The elephant, rhinoceros, tiger, leopard, and many species of deer haunt the jungles, as well as jungle and pea fowl, pheasants, partridges, and quails.

Akyab, Maulmain, and Rangoon are the chief seaports. Internal communication is chiefly carried on by water, but two lines of railway have their terminus at Rangoon: the one extends to Prome, on the Irawadi; the other stretches *via* Pegu to Mandalay, and N. to Myitkyana. A branch extends into the valley of the Upper Salwin, and is intended in time to reach the Chinese frontier.

Burma is under the political control of the government of India, and is ruled by a lieutenant-governor. For administrative purposes the province is divided into two parts—Lower and Upper. Lower Burma (cap. Rangoon) covers an area of nearly 81,200 sq. m.; Upper Burma (cap. Mandalay) has an area of nearly 87,500 sq. m.; native states, about 68,000 sq. m. Though no part of Burma can be said to be under native rule, the petty chieftains in the Shan States and in the Chin, Arakan, and Kachin hills have considerable influence over their sometimes turbulent followers.

The Burmese are Buddhists. At Mandalay there is a small community of Mohammedans. There is a college at Rangoon (over 100 students). A large percentage of the people, beyond the

priesthood, have passed through the monasteries scattered over the country, and are proficient in native ecclesiastical lore. A conservative, light-hearted race, callous of life and jealous of their faith, the people are ordinarily of a kindly disposition. Under provocation they are apt to become vindictive and very cruel.

In ancient times civil war, conflict with Siam, and invasion by Chinese hordes were frequent. The first collision, on Burmese soil, between European powers, took place about the middle of the 18th century, when the French, as partisans of the Peguans, opposed the British, as supporters of Burman rule. Having assisted in the consolidation and extension of Burmese empire, the British found themselves called upon to repel an invasion of Bengal by Burmese troops, and this led to the first Burmese war, which began in 1824 and lasted two years. Peace was unbroken until 1852, when political and commercial complications again drove the British into war, which, however, terminated in less than twelve months. As a result the whole of the territory now known as Lower Burma passed into the possession of the crown. Upper Burma maintained its independence until January 1886, when gross misrule and barbarous cruelties led to a war (1885) with the Indian government, and to the deposition of Thobaw and the annexation of his kingdom.

Temples, tombs, and other monuments of archaeological and historical interest exist at Pagan, Ava, Sagaing, Mandalay, Tagaung, Prome, Pegu, Toungoo, Maulmain, and many parts of Arakan. Some striking specimens of Buddhist religious architecture at Pagan have been much shattered by earthquakes. Efforts are being made for the conservation of the ancient monuments. Pop. of Lower Burma, 5,500,000; of

Upper Burma, 4,000,000; native states, 1,000,000. Total, 10,500,000.

Language and Literature.—Burmese, an isolating language, is composed of mere roots incapable of composition or inflection, and altered by affix and prefix into different parts of speech. It prevails throughout Burma, except in coastal villages where Talaiing is taught in Buddhist monasteries. The alphabet, consisting of ten vowels and thirty-two consonants, is a circular variety of the ancient Deva Nagri, introduced from Ceylon (450 A.D.) by the Buddhist missionary Buddhagosa ('Voice of Buddha'). Buddhist doctrine, at first oral, was subsequently written in Pali, the language of the sacred books. Burmese is akin to the Tibetan tongue, while Talaiing has been wrongly connected with the Kolarian group of Central India—the former being soft and labial, as Italian; the latter harsh and guttural, as Arabic. The order of words in Talaiing is natural, in Burmese inverted. Thus, Csoma de Körös, in his Tibetan grammar, gives the order of words in the phrase 'in a book seen by me' as 'me by seen book a in.' Burmese is monosyllabic, except in words of Pali origin, and is written from left to right, without any division between the words. The symbol '5' is used before beginning an epistle, alluding to the five commandments (*Pey-nytseng*), supposed to be borne in mind by the writer. Many words of similar spelling and slightly different pronunciation render the language difficult of acquisition. Sex is indicated by an affix, and vowels combined with consonants by symbols. In combining a noun and a numeral the genus is added. Thus, 'two oxen' is expressed, 'oxen two animals.' Burmese literature is divided into sacred and secular, the for-

mer written in Pali, the latter in Burmese. The two great metaphysical works of Indian origin are the *Bee-da-gat thoon-bon*, or *Pilakutayan* (The Three Baskets), and the *Baideng*. The former contains the three great divisions of the Buddhist scriptures, and is voluminous, being made up of *Thuttan* (The Rule), sermons of *Gautama*; *Winiya* (Discipline), rules for the priesthood; and *Abhidhamma* (Pre-eminent Truths), expressed in short dogmatic sayings. The *Baideng*, in four parts, one of which has been lost, treats of mathematics and astronomy, or rather astrology. The secular writings comprise chronological history, medicine, topography, ballads, and romances purer in sentiment than those of India. The drama, a national institution, is immensely popular. The dialogue is chiefly recitative, and solos, choruses, and dancing are interspersed, the music being sweet and attractive. Burmese war-boat songs are stirring and lively, the steersman (*pai-neng*) delivering the recitative, and the crew joining in the refrain, to which they roar keep time. Books, composed of leaves of the *Palm* palm joined at the ends by string, are bound between wooden covers, gilt, and lacquered in coloured devices. The letters are engraved with an iron stylus, and rendered visible by means of a mixture of charcoal and fragrant gum, the latter acting as a preservative against insects. See Fytche's *Burma, Past and Present* (1878); Wheeler's *History of India and Burma* (1880); *The British Burma Gazetteer* (1880); Mason's *Burma: its People and Productions* (1882); Playre's *History of Burma* (1883); Murray's *Handbook for India and Burma* (1891); Forchhammer's *Notes on the Languages and Dialects of Burma* (1884); Slack's *Manual of Burmese* (1888); *Anglo-Burmese*

Grammatical Reader (1889); St. John's *Burmese Reader* (1894); Judson's *English and Burmese Dictionary* (1894); Sir J. G. Scott's *Burma* (1907); and O'Connor's *Mandalay and other Cities of the Past in Burma* (1907). The most comprehensive work on the subject is Alleyne Ireland's *Province of Burma* (1908).

Burmans, a learned Dutch family, of whom the most distinguished members were FRANZ BURMANN (1628-79), theologian, born at Leyden. He wrote several commentaries on books of the Old Testament. His son, PETER BURMANN THE ELDER (1668-1748), a famous member of the Dutch philological school, was born at Utrecht. He became professor of rhetoric and history at Utrecht in 1696, later of Greek literature and politics, and in 1715 professor of rhetoric at Leyden. His works, chiefly editions of the Latin classics, include *De Vectigilibus Populi Romani* (1694; new ed. 1737), *Sylloge Epistolarum* (1727), and editions of Horace (1699), Petronius (1709), Velleius Paterculus (1719), Quintilian (1720), Justin (1722), Valerius Flaccus (1724), Ovid (1727), *Poetæ Minores* (1731), Suetonius (1736), Lucan (1740).—PETER BURMANN THE YOUNGER (1714-78), philologist, nephew of the preceding, born in Amsterdam, was professor at Franeker (1736-44), and at Amsterdam (1744-77). He published *Anthologia Veterum Latinorum Epigrammatum* (2 vols. 1759), besides editions of Virgil (1746), Aristophanes (1760), Claudian (1760), Propertius (1780), etc.—JOHANN BURMANN (1706-99), botanist, brother of Peter the younger, wrote *Thesaurus Zeylanicus* (1737), *Rariarum Africanarum Plantarum Decades* (1738-9), *Flora Malabarica* (1769), *Index alter in omnes Tomos Herbarii Amboinensis Rumphii* (1769).

Burn, AMOS (1848), English chess-player, was born at Hull.

He has taken a prominent part in the international tournaments since 1886, winning those of Nottingham (1886), Amsterdam (1890), and Cologne (1898) outright. He is one of the finest English amateur chess-players of the day.

Burn, RICHARD (1709-85), English legal writer, was vicar of Orton, in Westmorland (1736-85). He wrote *The Justice of the Peace and Parish Officer* (1755; 29th ed. 1845), a book of great value; *Ecclesiastical Law* (1760; 9th ed. 1842); *Hist. of Westmoreland and Cumberland* (1771); and *Hist. of the Poor Laws*.

Burn, WILLIAM (1789-1870), Scottish architect, practised very successfully first in Edinburgh (1814), his native town, and then in London (1844). He made his reputation by public buildings—e.g. St. John's Church and the Melville Monument, Edinburgh; but more by domestic architecture—e.g. Riccarton, Niddrie, Tynninghame, and other mansions in many British counties.

Burnaby, FREDERICK GUSTAVUS (1842-85), English cavalry officer and traveller. A man of enormous physical strength, great size, and delightful manner, he was especially distinguished by his extraordinary intrepidity and love of perilous adventure and of battle. His unusual knowledge of languages helped him in many adventurous journeys. He travelled in equatorial and southern America; acted as *Times* correspondent with the Carlist forces in 1874; in the following year followed Gordon to the Sudan; attempting, that winter, to reach Central Asia, he 'rode to Khiva,' where he was stopped by a wire from the Duke of Cambridge. In 1876 he went 'on horseback through Asia Minor' to study Turkish administration; commanded, in 1877, a Turkish brigade in the war with Russia; engaged in adventurous aeronautic expeditions,

one of which, in 1862, was 'a ride across the Channel'; was wounded at El Tob (1884) under Graham; and in 1885 was killed at Abu Klea, where he fought as a volunteer. See *Ride to Khiva* (1876); *On Horseback through Asia Minor* (1877); *A Ride across the Channel* (1882); also Ware and Mann's *Life* (1885).

Burnand, SIR FRANCIS COWLEY (b. 1836), English dramatic author, and editor of *Punch* (1880-1906). He is the author of nearly one hundred dramatic pieces, chiefly burlesques and comedies. 'Mokoanna,' his first contribution to *Punch* (1868), was followed by the 'Happy Thoughts' series, containing many amusing hits on leading novelists—such as 'Strapmore,' a parody on Ouida's *Strathmore*, and issued since in book form. Among his best-known dramatic productions are *Black-eyed Susan*, *The Colonel*, and the libretto of Sullivan's opera *The Chieftain* (1894). He was knighted in 1902. In 1904 appeared his *Records and Reminiscences*.

Burne, SIR OWEN TUDOR (1837-1909). As private secretary to two Indian viceroys, as secretary for many years of the Political and Secret Department of the India Office, and as a member of the Secretary of State's Council, Sir Owen Burne was the official confidant of several eminent Victorian statesmen. Born at Plymouth, he was given a commission in the army. He reached Calcutta in the Mutiny year, and as a young subaltern was in fifteen of the later actions, mostly in Oudh, including the final siege and capture of Lucknow. He rendered conspicuous service, and was recommended for the V.C. In 1860 he became military secretary to the commander-in-chief, Sir Hugh Rose (afterwards Lord Strathnairn), and in 1868 private secretary to the viceroy, Lord

Mayo, who was assassinated in February 1872 at Port Blair. He published his *Reminiscences* in 1907.

Burne-Jones, SIR EDWARD, BART. (1833-98), British artist, of Welsh descent, was born in Birmingham. A fine classical scholar, he went to Oxford (1853) to study for the church. A sudden awakening of his genius came from his friendship with his fellow-undergraduate William Morris, and with D. G. Rossetti. Thenceforth he devoted himself absolutely to art. At first he studied (1856) under Rossetti, and worked with him on the walls of the Oxford Union. Together with Rossetti and Morris he has profoundly affected the renaissance in England of decorative art and the artistic crafts. He designed stained-glass windows for churches in England, America, India, Germany, France; and the mosaic decorations in the apse of the American Church, Rome, are his work. The earlier paintings show the influence of Rossetti; but individuality was asserted in *The Merciful Knight* (1864). During a visit to Italy in 1862 with Ruskin, Burne-Jones learnt much from Botticelli and something from Mantegna. His draughtsmanship is fine and clear; his composition shows indefatigable scholarship and poetic fancy; his typical figures of brooding melancholy symbolize the struggle of the human soul with destiny; his colour is rich and suggestive, his finish elaborate and expressive. An associate (1864) of the Royal Society of Painters in Water Colours, he resigned (1870) owing to a misunderstanding, and later was re-elected. Down to about 1875 he worked principally in water colours, but after that date most of his pictures were done in oils. In 1885 he was elected A.R.A., but exhibited one picture only, and resigned in 1893. He was created

baronet in 1894. Among his paintings are *The Mirror of Venus*, *Pan and Psyche*, *The Beguiling of Merlin* (1877), *Perseus and Andromeda*, *The Days of Creation* (1877), *Love among the Ruins*, and *The Briar Rose* (1890). The Tate Gallery possesses *King Cophetua and the Beggar Maid* (1884); Manchester, the *Sibylla Delphica*; Glasgow, *The Brazen Tower*; Liverpool, *Sponsa di Libano*; Birmingham, *The Star of Bethlehem* (1891), thirty cartoons for windows, and several studies and sketches. In 1903 were published a series of twenty-five designs by him entitled *The Beginning of the World*. See 'Sir Edward Burne-Jones,' by Julia Cartwright, in *Art Annual* (1894); Malcolm Bell's *Burne-Jones: Life and Work* (new ed. 1901); *Memorials of Burne-Jones*, by G. B. J. (1904); Ruskin's *The Art of England* (1884), and *The Mythic Art* (1883); *Alexandre's Essay on Sir E. Burne-Jones* (1907); and *Life* by Malcolm Bell (1909).

Burnell, ARTHUR COKE (1840-82), English Sanskrit scholar, born at St. Briavels, Gloucestershire. He was in the Indian civil service from 1857-68, and afterwards became an authority on Sanskrit and S. Indian dialects, his principal work being *Classified Index to the Sanskrit MSS. in the Palace at Tanjore* (1880). He has also published *Catalogue of a Collection of Sanskrit MSS.* (1869), *The Law of Partition and Succession* (1875), *Brāhmanas of Sāmaveda* (1873-8), *Handbook of S. Indian Palæography* (1874), *The Aindra School of Sanskrit Grammarians* (1875). A translation of the *Ordnances of Manu* appeared in 1884.

Burnes, SIR ALEXANDER (1805-41), traveller in Asia, a native of Montrose, Scotland, entered the Indian army in 1821. His knowledge of languages led to his being employed as interpreter, then entrusted with special mis-

sions by the Indian government. In 1832-3 he explored in disguise Afghanistan, Bokhara, and Persia, and published *Travels into Bokhara* (1834), which proved very popular. In 1839 he was appointed political resident in Kabul, but two years later fell a victim to the Afghan mob. See Sir J. W. Kaye's *Lives of Indian Officers* (1889).

Burnet. Three perennial plants bearing the name of burnet occur wild in Britain. The common burnet (*Sanguisorba officinalis*) occurs in damp meadows, and bears heads of purplish flowers, each with four stamens, in late summer; the common salad burnet (*Poterium Sanguisorba*) occurs in dry meadows, and bears heads of crimson flowers. The prickly salad burnet (*P. muricatum*) is much like the last named. All three plants have pinnate leaves, serrated at their margins, but those of the salad burnets have the taste of cucumber.

Burnet, GILBERT (1643-1715), bishop of Salisbury, was the eldest son of Robert Burnet of Crimond, Aberdeenshire, and was born in Edinburgh. In 1665 he was ordained by the bishop of Edinburgh, and appointed minister of the parish of Saltoun in East Lothian, where he remained until 1669, when he was elected to the chair of divinity in the University of Glasgow. It was at this time that he declined the offer of a Scottish bishopric—an offer which was again made to him when he published (1672) his *Vindication of the Authority, Constitution, and Laws of the Church and State of Scotland*. In 1674 he proceeded to London, and was appointed chaplain at the Rolls Chapel and lecturer at St. Clement's. The first two volumes of his *History of the Reformation of the Church of England* appeared in 1679-81, but the third volume was only published the year before his

death. Throughout his life Burnet exercised a great influence on British politics. His fearless criticism of Charles II. and his championship of Lord William Russell so aroused the displeasure of the king that he deprived Burnet of both his chaplaincy and his lectureship. The revolution of 1688 had no stronger supporter than Bishop Burnet, who at length accepted the episcopal dignity under William of Orange, being consecrated bishop of Salisbury in 1689. His predilections were strongly Whig and anti-Catholic. In 1701 he was chairman of the committee for the final consideration of the Bill of Rights. He supported the Act of Toleration, and opposed the 'High Church and Sacheverell' party; but his unvarying loyalty to the Church of England was nowhere more practically manifested than in his organization (1701) of Queen Anne's bounty. He was also a warm supporter of the policy of carrying out a legislative union between England and Scotland. His most famous achievement, *Bishop Burnet's History of his own Time*, was not published until 1724-34, and even then not without mutilations; the first complete version was issued by Dr. Routh at Oxford, in 6 vols., in 1823 (newer ed. 1897). See *Lives* by Le Clerc, Flaxman, and Clarke and Foxcroft (1907), Wyon's *Reign of Queen Anne*, and Guizot's *Notice sur Burnet*—a masterly criticism.

Burnet, JOHN (1784-1868), engraver and painter, was born at Musselburgh, near Edinburgh. He went to London (1806), where he was welcomed by Wilkie, illustrated the *Novelist*, and executed large plates of Wilkie's works—e.g. *The Blind Fiddler* (1806-10). He painted many landscapes; his *Greenwich Pensioners* is well known. Among his publications are *A Practical Treatise*

on *Painting* (1822-7), *Rembrandt and his Works* (1849), and, with Allan Cunningham, *Life and Works of Turner* (1852).

Burnet, THOMAS (?1635-1715), master of Charterhouse, is remembered for two books, eloquent and fine in style, but fanciful in matter—*Telluris Theoria Sacra* (1681-9), an attempt to account for the shape of the earth as a gigantic egg whose shell was crushed at the deluge; and *Archæologia Philo-sophica* (1692), an attempt to reconcile this theory with Gen. i. See *Life* by Heathcote, prefixed to 7th ed. of *Theoria* (1754).

Burnet Moths, the name given to the species of the genus *Zygæna*, which are moths remarkable for their bold colouring, the wings being usually spotted and marked with green, red, and black. The caterpillars are hairy, and the spindle-shaped cocoons are attached to vertical blades of grass or stems of plants. There are four British species of burnet moth, the commonest being the six-spotted burnet (*Zygæna filipendula*).

Burnett, FRANCES HODGSON (1849), English novelist, spent her early life in Manchester, and there gained her knowledge of Lancashire scenes and dialect. In 1865 her parents removed to the United States, and Miss Hodgson began to write stories for the American magazines. She was made famous by her story 'That Lass o' Lowrie's', published in *Scribner's*, and then in book form (1877). It was followed by *Haworth's* (1879), and *A Fair Barbarian* (1881). *Little Lord Fauntleroy* appeared in 1886, and both as novel and as drama achieved exceptional success. Other novels are *A Lady of Quality* (1896; dramatized), *His Grace of Ormonde* (1897), *The Making of a Marchioness* (1901), *The Little Unfair Princess* (1902), and *The Dawn of a To-morrow* (1907).

Burnett, GEORGE (1822-90), Scottish genealogist, born in Aberdeenshire, was called to the Scottish bar (1845), but gave up law for genealogical and heraldic studies, and was appointed Lyon king-of-arms (1866). He edited several volumes of *Exchequer Rolls of Scotland, 1264-1507* (1881-90), and wrote *Popular Genealogists, or the Art of Pedigree Making* (1865), *The Red Book of Men-tith Renewed* (1881), *Treatise on Heraldry, British and Foreign* (with Rev. John Woodward, 1891), and other works.

Burnett, JAMES. See MON-BODDO.

Burney, CHARLES (1726-1814), English musician, was born at Shrewsbury, and became a pupil (1744-7) of Dr. Arne; organist at Lynn (1751-60), and at Chelsea Hospital (1783-1814). Wrote a *History of Music* (1776-89).

Burney, CHARLES (1757-1817), English classical scholar, son of the preceding, was born at Lynn, Norfolk. He took orders, and held several livings. Burney wrote in the *Monthly Review* and *London Magazine*, of which he was editor, and published several works, including *Tentamen de Metris Æschyli* (1809), *Philemonis Lexicon Technologicum* (1812), and *Epistolæ ineditæ R. Bentleyi* (1807). He collected a valuable library, which was purchased for the British Museum by the state; he was considered one of the chief exponents of English scholarship. See *Memo. D'Arblay's Memoirs of Dr. Burney*.

Burney, FRANCES, MME. D'AR-BLAY (1752-1840), born at King's Lynn. In 1760 she went to London, where she met the most cultured people of the day, including Johnson, Garrick, and the Thrales. *Evelina, or the History of a Young Lady's Entrance into the World*, was published anonymously in 1778. It achieved an immediate success. *Cecilia, or the Memoirs*

of an *Heiress*, followed in 1782, with even greater éclat. In 1786 she became second keeper of the robes to the queen; but her health broke down under the restraint of court life, and she retired on a pension in 1791. Two years later she married General D'Arblay, a French refugee. In 1795 she produced *Edwy and Elgiva*, a tragedy, which proved a failure. *Camilla, or a Picture of Youth*, her third novel, appeared in 1796, and *The Wanderer, or Female Difficulties*, her last, in 1814. Much of her married life was spent in France (1802-12); thereafter she lived chiefly in England. Her *Diary* (published with her letters, 5 vols., in 1842, and 2 further vols. in 1846) forms an almost continuous narrative from 1778 to 1800, and, in its brilliant sketches of court life and society, exhibits at their best her signal powers of satire and observation. The simplicity of theme which marked *Evelina* gave way in *Cecilia* to a more ambitious but less successful plot; and the fresh manner of her earliest novel deteriorated more and more with each successive work, under the influence of Dr. Johnson's literary style, till in the *Memoirs of Dr. Burney* (1832) all is stilted rhetoric and pompous sentiment. In taking the satire of domestic life as the theme of her novels she marked a new departure, and became the precursor of Miss Edgeworth and Jane Austen. In 1830 Mrs. Ellis edited Fanny Burney's *Early Diary, 1768-78*, 2 vols. See Boswell's *Life of Johnson* (ed. Birkbeck Hill, 1886); Macaulay's *Essay on Madame D'Arblay*; *Evelina* and *Cecilia* (1881 and 1832), with introductions by Annie Raine Ellis; L. B. Seeley's *Fanny Burney and her Friends* (1895); *Diary and Letters of Madame d'Arblay*, ed. C. Barrett and Austin Dobson (6 vols. 1905); and Constance Hill's *The House in St. Martin's*

Street: Being Chronicles of the Burney Family (1906).

Burnham, FREDERICK RUSSELL (1861), American scout, was born on the frontier of Minnesota. Going out to S. Africa in 1893, Burnham was enlisted in the service of the British S. Africa Company, and was one of the handful of men under Major Wilson who were intent on the capture of Lobengula, the Matabele king. Burnham, however, made his way through the Matabele back to the main body to hurry up reinforcements. In the second revolt of the Matabele (March 1896) Burnham again took service with the Chartered Company, and distinguished himself by shooting the high priest of the Kaffirs, M'limo, who had instigated the revolt. Burnham next appeared in the gold fields of Klondike. But almost before he had settled in Alaska, Lord Roberts summoned him to S. Africa for special service in the Boer war (1899-1902). He destroyed the railway between Johannesburg and Pretoria. When Broadwood's convoy was captured at Sanna's Post (March 31, 1900), Burnham was taken prisoner, but escaped. His last exploit was to destroy the railway east of Pretoria, which prevented the Boers from getting their British prisoners away by train.

Burnham Beeches, a picturesque part of an ancient forest in Buckinghamshire, England, 5 m. N.W. of Slough. In 1900 some fine patches of the ancient forest were purchased by the corporation of London for a public recreation ground. Burnham Beechos was a favourite resort of the poet Gray. Dropmore, a seat 2 m. N.W. of Burnham village, is noted for its fine collection of Conifers, and for a magnificent avenue of cedars of Lebanon, both planted by Lord Grenville. See Sheahan's *Hist. of Buckinghamshire* (1862).

Burnie, a port on the shores of Emu Bay, Tasmania, the terminus of the Western Ry., connecting with Launceston and Hobart, about 90 m. W.N.W. of Launceston. Pop. 1,750.

Burning. See COMBUSTION.

Burning Bush, a popular name given to several deciduous and evergreen ornamental shrubs of the genus *Euonymus* and order Celastrineæ, with deep scarlet and purple flowers. They are natives of temperate regions, and are propagated by cuttings in autumn or grown from seed.

Burnley, mkt. tn., munic., parl., and co. bor., E. Lancashire, England, on L. & Y.R., 21 m. E. of Preston. Area, 4,015 ac. The town was incorporated in 1861; parl. bor. (returning one member to the House of Commons) in 1867; co. bor. in 1889; and other townships amalgamated with the township of Burnley in 1891. The public buildings include Victoria Hospital, mechanics' institution and school of science, and technical school. The town has grown within recent years from a small place to a great manufacturing centre. There are fine public parks and numerous recreation grounds. Cotton spinning and weaving, iron-founding, the making of weaving machinery, coal-mining, and stone and slate quarrying are among the chief industries of town and neighbourhood. The Leeds and Liverpool and other canals facilitate transport. Pop. 108,000.

Burnouf. (1.) JEAN LOUIS (1775-1844), French philologist, born at Urville, became assistant professor of rhetoric at the Lycée Charlemagne in Paris, and was soon afterwards presented to the chair of rhetoric at the Lycée Imperial, which he held till 1826. He was professor of Latin rhetoric at the Collège de France and president of the Ecole Normale (1811-22). From 1830-6

Burnouf was inspector-general of studies, and on his retirement was made librarian of the university. The *Méthode pour Etudier la Langue Grecque* (1814) and *Méthode pour Etudier la Langue Latine* (1840) are his most important works. (2.) His son EUGÈNE (1801-52), born at Paris, devoted himself to the study of Oriental languages; in 1826 published an *Essai sur le Pali*, and from that date was a constant contributor to the *Journal Asiatique* and the *Journal des Savants*. He is remembered for his deciphering of the Zend MSS. brought to Paris by Anquetil Duperron, his lithographed edition of the *Vendidad-Nadé* (1829-43), and his *Commentaire sur le Yaçna* (1833-4), which first made Zoroastrianism known to the West. Other works include an edition of the *Bhāgavata Purāna* (Sans. and Fr., 1840), *Introduction à l'Histoire du Bouddhisme* (1845), and *Lotus de la Bonne Loi* (pub. posthumously, 1852). In 1832 he succeeded Chézy as professor of Sanskrit in the Collège de France, and the same year was elected a member of the Académie des Inscriptions. See *Lives* by Barthélemy Saint-Hilaire (1892) and Berger (1893). (3.) EMILE LOUIS (1821), Orientalist, cousin of the preceding, was born at Valognes (Manche). He published *Méthode pour Etudier la Langue Sanscrite* (1859), *Dictionnaire Classique Sanscrit-Français* (1863-4), *La Mythologie des Japonais d'après de Koku-si-Ryakel* (1875), *Mémoires sur l'Antiquité* (1879), *Les Chants de l'Eglise Latine* (1887), and *The Science of Religions* (1885; Eng. trans. 1888).

Burns, SIR GEORGE. See INVERCLYDE, LORD.

Burns, JOHN (1858), English statesman and M.P. for Battersea (London) since 1892, began his public career as an aggressive leader of the extreme labour movement, and

a prominent member of the Social Democratic Federation. In 1886 he was prosecuted for using 'seditious language and inciting to riot,' but was acquitted. The assertion of the right to hold public meetings in Trafalgar Square in defiance of the public authorities brought him (1887) a short term of imprisonment. He was, in those days, the head and front of every strike or lock-out or labour agitation of any importance in the country, and figured with special prominence in the London dock strike of 1889. He advocated the nationalization of land, railways, and mines. As a boy he worked in a candle factory and an engine works. He was working at a printing-machine establishment when he was first elected to the London County Council in 1889. In December 1905 he was appointed President of the Local Government Board in Sir Henry Campbell-Bannerman's administration, with a seat in the cabinet, and retained that office in Mr. Asquith's government of 1910. He was largely responsible for the Housing and Town Planning Act, 1909. Of recent years, without losing touch with the life and opinions of the working classes, he has shown a sense of the need for national discipline and organization which has given him the confidence of all serious citizens.

Burns, ROBERT (1759-96), Scottish poet, was the son of a gardener, and was born at Alloway, near Ayr, Scotland, on Jan. 25, 1759. William Burns left Alloway, where he had tried market-gardening, when his son Robert was about seven, and took the small farm of Mount Oliphant, about two miles distant. Burns employed no servant, and his sons had to work incessantly in the fields: the hardship of his early life broke Robert's health, and produced a tendency to hypochondria.

The farm at Mount Oliphant was a complete failure; and in 1777, when the poet was eighteen, the family removed to the farm of Lochlea, in the parish of Tarbolton. Before this time a juvenile love affair and the bitterness of his lot had inspired him to poetical composition. At Lochlea life was somewhat easier. Robert read less, but mixed more freely in society, became a noted philanderer, and wrote verses on his loves; he was also an active member of a bachelors' club or debating society. After a brief stay in the town of Irvine, for the purpose of learning flax-dressing, where he met 'acquaintances of a freer manner of thinking and living than he had been used to,' he returned to farming at Lochlea, and devoted himself more assiduously to poetry.

On their father's death (in difficulties), in 1783, Robert and Gilbert took the farm of Moss-giel, in the parish of Mauchline, two or three miles from Lochlea. But for them, as it had been for William Burns, farming was a losing game. Industry was of no avail against adverse circumstances, and Robert submitted more and more readily to his destiny as a poet. The song *Mary Morison* was a product of the Tarbolton period. The *Epistle to Davie* was the prelude to a brilliant period of poetry at Moss-giel, which in a year or two furnished the contents of that treasure of the bibliophile, the Kilmarnock Burns. The birth of an illegitimate child brought Robert under ecclesiastical discipline, and an inherited liberalism in theology impelled him to use his talent in the controversy, which was then at its height, between 'Old Lights' and 'New Lights' (afterwards Moderates and Evangelicals) in the Church of Scotland. The result was a series of satires which brought him the friendship

of a number of the liberal clergy, and, being circulated in manuscript, made for him a wide reputation for latitudinarianism. The poet had now reached his intellectual prime. To this period belong *The Two Herds*, *Holy Willie's Prayer*, the *Address to the Unco Guid*, *The Holy Fair*, and the *Address to the Deil*. To the winter of 1785-6 are assigned the last of these, and also *To a Mouse*, *Hallow E'en*, *Man was made to Mourn*, *The Cottar's Saturday Night*, *The Jolly Beggars*, *To James Smith*, *The Vision*, *The Author's Earnest Cry and Prayer*, *The Two Dogs*, *The Ordination*, and *Scotch Drink*.

In the spring of 1786 it became necessary for him to acknowledge as his wife Jean Armour, a Mauchline girl, and in order to support her he thought of going to Jamaica to seek his fortune. To procure money for his passage, he collected the best of his work into a volume which was published at Kilmarnock in July of the same year. The Armours had previously cast him off—he was not considered socially good enough for the daughter of a master mason—and, according to tradition, he made love to and would have married, but for her sudden death, Mary Campbell, a Highland servant, whose personality has been a will o' the wisp to his biographers, and who was the subject of some of his most exquisite poems. The publication of the Kilmarnock volume changed the current of his life. The gentry of Ayrshire were proud to patronize the author; the Jamaica venture was abandoned with the birth of his son by Jean Armour; Dr. Blacklock, the blind poet and critic, eulogized the poems in the *Edinburgh Magazine*; and before the year was out, Burns, who had made £20 by the sale of 600 copies of his book, was in Edinburgh ar-

ranging for the publication of a second edition.

He was welcomed warmly by two social sets—the literary and fashionable circle (including the Duchess of Gordon and the Earl of Glencairn), among which were Dugald Stewart, Blair, Robertson, Henry Erskine, Henry Mackenzie, and Lord Monboddo; and another circle of lawyers' apprentices and dissolute advocates, who made for him a social habitat of the same order as he had frequented in the Tarbolton bachelors' club and the Ayrshire masonic lodges. In the society of his intellectual peers, he found himself at once at home, behaved with native dignity, and impressed all with the strength of his personality and the originality of his mind. The first Edinburgh edition of his poems was published in 1787 by subscription, and ultimately he gained some £500 by it. Various proposals for a career were made to him, but he decided to go back to farming. While waiting for a settlement with his publisher, Creech, he spent the latter part of the year 1787 in a series of tours through Scotland, and made a second short stay in Edinburgh, where, the novelty of the ploughman-poet having worn off, he was less cultivated by society. It was at this time that he formed the connection with a grass widow, a Mrs. Maclehorse, the Mrs. Maclehorse of the 'Sylvander and Clarinda' correspondence.

In February 1788 he went home to Mossgiel with his £500, lent Gilbert £180, and married Jean Armour. He had taken a lease of the farm of Ellisland, in Dunscore parish, Dumfriesshire, and by the end of the year he was settled there. But Ellisland proved as unsuccessful as Mount Oliphant. The poet sank his little capital in it without hope of redemption, and in order to make a livelihood became

an exciseman. The double labour of farming and 'gauging,' however, proved too severe, and by the end of 1791 he was glad to break the lease and remove to Dumfries, where he spent the rest of his life in the service of the excise. At Ellisland he wrote a great many songs, including *Mary in Heaven*, *Auld Lang Syne*, and *Ye Banks and Braes*, for Johnson's *Scots Musical Museum*, to which he had begun to contribute during his stay in Edinburgh; also *Tam o' Shanter*, *The Whistle*, and *The Kirk's Alarm*. He was a welcome guest at the tables of the Dumfriesshire lairds, and was in the main satisfied with his social position, merely looking forward to promotion in the excise—a prospect which was blighted by his political ideas. He had written occasional partisan diatribes—*The Five Carlins*, for example—at Ellisland, and the editor of the London *Star* had offered him a permanent appointment, which he declined. He continued to devote his attention to political questions, and the French Revolution claimed his sympathy more and more. It is noteworthy, however, that on the threat of invasion he became a volunteer, and wrote *Does Haughty Gaul Invasion threat?* His later years were embittered with neglect and pecuniary difficulties, and he died of rheumatic fever on July 21, 1796. He wrote songs to the last—for instance, *Duncan Gray* and *O wert thou in the Culd's Blast*.

Burns was the greatest of the Scottish vernacular poets, from whom he took his forms and metres, and the one great poetic genius of Scottish literature. In the vernacular he was at his best a supreme artist in words and an unequalled songwriter. See *The Life and Works of Robert Burns*, by Robert Chambers, revised by William Wallace

(ed. 1896); Henley and Henderson's *The Poetry of Robert Burns* (ed. 1896), containing Henley's famous and much criticized essay on the poet; T. F. Henderson's *Life of R. Burns* (1904); Carlyle's *Essays*, vol. ii. (1869); Leslie Stephen, in the *Dict. of Nat. Biog.*

Burns and Scalds are considered together, as for practical purposes their effects are the same, and differences in treatment depend only upon the extent of injury and the amount of sepsis (bacterial infection) present or to be feared.

The danger of a burn is proportionate to its superficial extent, and depends also partly upon its position. Death may be expected if half the surface of the body is affected, even though there be no depth of tissue destroyed. Burns on the trunk are more dangerous than those on the limbs, and children succumb more readily than adults. It cannot always be said what is the immediate cause of death. Shock, no doubt, accounts for many deaths, and sepsis for others. Exhaustion following profuse suppuration is another cause; and there are cases in which death has ensued owing to the direct effect upon the blood of great heat. Another danger is deep-seated inflammation, when the seat of the burn is over important organs. There is also a risk of dangerous swelling of the tissues of the throat after swallowing boiling or corrosive fluids. Shock, and the exhaustion consequent on it, must be combated by stimulants, blankets, and hot bottles. The exhaustion consequent on suppuration, which may come later, must be met by suitable dressings, and by the continued and careful use of stimulants. When the throat and œsophagus are affected, feeding may be carried on by the stomach-tube or by enemata; and difficult

respiration may require tracheotomy.

The local treatment of burns depends to some extent upon their position, depth, and extent. The aim is to counteract sepsis, or to prevent it; to relieve pain; and to prevent scarring, or, if that be impossible on account of the depth of burn, to make it as slight as possible, and to guard to the utmost against deformity by contraction. Thus, we first cleanse the burned surface with antiseptic lotion (sometimes under chloroform), and then apply suitable dressings, which are left undisturbed as long as it is safe. A burn on a limb may sometimes render amputation necessary. In cases of burns covering large surfaces, some recommend the continuous warm antiseptic bath, especially for children. Further, if the whole thickness of skin has been destroyed, attempts must be made to supply the deficiency by means of skin-grafting. The burned surface is first carefully purified, and for that purpose some use boracic lotion, some weak carbolic, while others use a two per cent. solution of picric acid. For after application, as dressing, orthoform and aristol are among the newer recommendations; but the dressing most in favour is picric acid, first advocated by French surgeons. A one per cent. solution is often enough, and this strength is practically a saturated solution. Strips of gauze, lightly wrung out in this lotion, are so placed as to cover the cleansed surface, and are themselves covered with antiseptic wool and a bandage. The dressing should be left undisturbed as long as possible, and may prove efficient for from four to six or seven days. It must be changed if suppuration soaks through, or if there are signs of sepsis. Pieces adherent should not be dragged off, but should

have the picric acid solution poured on them. The part, if a limb, may be kept at rest by a splint.

Burnside, suburb of Adelaide, S. Australia, 4 m. E. of the capital; is a great wine-producing district. Pop. 500.

Burnside, AMBROSE EVERETT (1824-81), American general, first saw service in the Mexican war. Early in the civil war he commanded a brigade for the North in the battle of Bull Run; then assisted M'Clellan in organizing the army; and for the capture of the island of Roanoke, in 1862, he was made major-general. He fought successful engagements at Newbern and Beaufort; and when the Confederates invaded Maryland, he assisted M'Clellan in defeating them at S. Mountain. Burnside led the left wing in the sanguinary battle of Antietam, and subsequently commanded one of the three great divisions of the army of the Potomac, and finally the whole army, from which he was transferred to the army of the Ohio. Defeated by the Confederates before Fredericksburg in 1862, he was relieved of his command, but later (May to August 1864) had charge of the 9th corps under Grant, and remained in active service until the close of the war. He was governor of Rhode I. from 1866 to 1869, and senator for the island from 1875 to 1881. While in Europe during the Franco-German war, he endeavoured to act as a peace negotiator between the parties. See *Life* by Poore (1882).

Burnside, HELEN MARION (1844), English artist and poet, has exhibited at the Royal Academy (1863), Columbian exposition (1895), and Society of Lady Artists (1897); was designer to the Royal School of Art Needlework (1880-9). She has written *Poems* (1864), *Driftwood* (1897), *Her Highland Laddie* (1897), *Tales for*

Children (1897), *The Deaf Girl Next Door* (1899), and *A Girl Without a Penny* (1907).

Burntisland, tn. and par. of Fifeshire, Scotland, on N. shore of Firth of Forth; 20 m. by rail (*via* Forth Bridge) from Edinburgh, and connected with Granton (5 m.), on s. side of firth, by steam ferry. It is a royal and parliamentary burgh, important coaling port with large docks, and a summer resort for golf and sea-bathing. There are several antiquities in the parish, including Rosend Castle (1382). Pop. 5,000.

Burnt Stones, antique gems of carnelian, sometimes engraved, found in Roman ruins. They appear to have undergone firing, to make a thin surface layer semi-opaque and give them a resemblance to sardonyx.

Burr, AARON (1756-1836), American soldier and statesman, was the grandson of Jonathan Edwards. He distinguished himself at Bunker Hill, in Arnold's expedition to Canada, and at Hackensack and Monmouth; he retired in 1779. In 1782 he was called to the bar, and from 1789-90 was attorney-general of New York State, from 1791-7 United States senator, and from 1801-5 vice-president of the United States. Defeated in a contest for the governorship of New York, he forced a duel upon the most formidable of his opponents, Alexander Hamilton, of whom he had long been jealous. Hamilton fell mortally wounded, and Burr was indicted for murder, but escaped punishment. He next endeavoured to raise a force to conquer Texas, where he intended to establish a republic. Jefferson proclaimed the scheme, and Burr was three times arrested and tried for treason and misdemeanour in 1806-7. Though he was acquitted his reputation was gone, and he went (1808) to Europe, where he interested several prominent men, in-

cluding Pontham, in filibustering designs upon Mexico. The British government ordered him to leave the country; and as he could obtain no encouragement from Napoleon, he returned to America in 1812. In Burr the finest gifts of nature were vitiated by a lack of moral character. See *Life* by Knapp (1835), *Memoirs* (1836) and *Journals* (1838) ed. by Davis, *Life* by Parton (1858) and by Todd (1902), *The Aaron Burr Conspiracy* by W. F. M'Cabe (1903), and Oliver's *Alexander Hamilton* (1905).

Burr, WILLIAM HUBERT (1851), American civil engineer, born at Watertown, Connecticut; has designed some of the most important works in America. His first public appointment (1876-84) was as professor of mechanics at Densselaer Polytechnic Institute. In 1892 he became professor of engineering at Harvard, and in the following year at Columbia University. In 1899 he was appointed a member of the (Central American) Isthmian Canal commission. He has published *Stresses in Bridge and Roof Trusses* (1880), *Theory of the Masonry Arch* (1881), *Ancient and Modern Engineering and the Isthmian Canal* (1902), and *The Graphic Method by Influence Lines for Bridge and Roof Computation* (1905).

Burra, or KOORINGA, tn. S. Australia, on Burra Creek, 101 m. by rail N. by E. of Adelaide; contains the once famous Burra Burra copper mine, discovered in 1844, but now deserted. Pop. 2,600.

Burrard Inlet, 9 m. long, Strait of Georgia, British Columbia, N. of mouth of Fraser R., is one of the safest harbours on the Pacific. Vancouver city, the terminus of the Canadian Pacific Railway, stands on S. shore.

Bur-reed, popular name for the various species of *Sparganium*, of the Typhaceæ, with long reedlike leaves and globose flower-heads

like burs, whence the name; common in ditches in Britain.

Burriana, *bu.*, prov. Castellon de la Plana, Spain, 8 m. s. by w. of Castellon, on railway from Tarragona to Valencia. A light railway now connects the port of Burriana with Castellon and Onda. Vegetables, fruit, and grain, and especially oranges and melons, are exported. Pop. 13,000.

Burritt, *ELIHU* (1810-79), American peace advocate, known as 'the learned blacksmith,' was born at New Britain, Connecticut. While working as a blacksmith he became proficient in mathematics, and especially in Oriental and modern languages, and translated all the Icelandic sagas relating to the discovery of America. In 1842, at Worcester, Massachusetts, he established the *Christian Citizen*, a weekly journal devoted to anti-slavery, peace, temperance, and self-culture. Visiting England, he projected (1847) the 'League of Universal Brotherhood,' which aimed at the abolition of war. About the same time he organized the first international peace congress, at Brussels, in 1848, and the second, at Paris, under the presidency of Victor Hugo, in 1849. In 1852 he became editor of the *Citizen of the World*, Philadelphia, in which he urged the compensated emancipation of southern slaves. Burritt paid a second visit to England in 1863, and in 1865-70 was United States consul at Birmingham, when he advocated an ocean penny postage. He wrote *Sparks from the Anvil* (1848), *Olive Leaves* (1853), *Thoughts of Things at Home and Abroad* (1854), *A Walk from John o' Groat's to Land's End* (1864), *Walks in the Black Country* (1868), *Lectures and Speeches* (1869), *Ten Minute Talks* (1873), and *Chips from Many Blocks* (1878). See *Life by Northend* (1879).

Burroughs, *JOHN* (1837), American author, was born at Roxbury,

New York, and was given an appointment in the United States Treasury (1863-72). He wrote a series of books on nature—*Wake Robin* (1871), *Winter Sunshine* (1875), *Birds and Poets* (1877), *Locusts and Wild Honey* (1879), *Signs and Seasons* (1886), *Squirrels* (1900), *Ways of Nature* (1905), and *Bird and Bough Poems* (1906).

Burrows, *CAPTAIN MONTAGU* (1819-1905), British naval officer, saw active service in engagements with Malay pirates (1836), and at the capture of St. Jean d'Acre (1840). In 1862 he was appointed Chichele professor of modern history at Oxford—a chair which he occupied until 1900. Among his works are *Pass and Class* (3rd ed. 1866), *Constitutional Progress* (2nd ed. 1872), *Parliament and the Church of England* (1875), *Life of Admiral Lord Hawke* (1883; 2nd ed. 1896), *Wielik's Place in History* (new ed. 1884), *Hist. of the Cinque Ports* (4th ed. 1895), *Commentaries on the Hist. of Eng.* (1893), *Hist. of Foreign Policy of Great Britain* (1895; 2nd ed. 1897). See his *Autobiography*, ed. by his son (1908).

Burrus, *AFRANIUS*, a Roman soldier, who in 52 A.D. was appointed sole commander of the prætorian guards. With Seneca he conducted the education of Nero, and it was mainly owing to his influence that Nero was declared emperor. Burrus did his best to prevent Agrippina's cruelty after Nero's accession, and later tried to save Agrippina herself, and Octavia, the emperor's wife, from Nero. Weary of his control, Nero caused him to be poisoned in 63 A.D.

Bursa and Bursitis. A bursa, or *bursa mucosa*, is a synovial sac interposed between muscles, tendons, or skin and bony prominences, for the purpose of lessening the friction to which these parts are exposed. Some bursæ are constantly present, but others

are developed as the result of occasional friction of muscles against each other or adjoining parts. They are liable to four kinds of disease. (1.) *Acute bursitis*, involving inflammation and suppuration, is most common in the bursa of the patella, or bone of the kneecap. The treatment consists in rest and hot fomentations, with incision and antiseptic dressings if pus forms. (2.) *Chronic bursitis*, or dropsy of the bursa, is an accumulation of fluid serum distending a bursa. The common form is 'housemaid's knee'; another is 'miner's elbow.' Treatment—rest, blisters, pressure, or aspiration. (3.) *Chronic enlargement, with fibroid thickening of bursa*. Treatment—removal by the knife. (4.) *Chronic bursitis*, with the presence of 'melon-seed' bodies. Treated by dissecting out the bursa, or opening it, evacuating its contents, and destroying the lining membrane by pure carbolic acid.

Bursar (*bursa*, a doublet for 'purse'). (1.) In English universities, the fellow who acts as treasurer of a college. (2.) In Scotland, the holder of a bursary or annual allowance obtained by presentation or after examination, and corresponding with the English scholarship. Since 1901, under the Carnegie Trust, any student of Scottish parentage can obtain a bursary to cover the cost of matriculation and class fees in any faculty of a Scottish university.

Burscheid, tn., dist. Düsseldorf, prov. Rhineland, Prussia, 17 m. N.W. of Cologne, with various woollen mills. Pop. 6,300.

Burschenschaft, a federation of German undergraduates' societies which had their rise in the patriotic fervour excited by the Napoleonic invasions. The first corps was formed at Jena (1813). Two years later, on the occasion of a festal gathering in honour of liberty at the Wartburg, near

Eisenach, certain irresponsible students burnt the works of contemporary writers whose tendencies were obnoxious to them. This, and the murder of the dramatist Kotzebue in 1819 by a Jena student (Sand), led the governments of Central Europe to suppress them. Nevertheless they quickly revived (1821), only to be once more proceeded against in 1830-3, among those implicated, though quite innocent of offence, being Fritz Reuter, whose *Ulm's Festungstid* (1862) was written during his imprisonment. Although all special restrictions against the *burschenschaft* societies were withdrawn in 1848, and the establishment of national and imperial unity was accomplished in 1870, these patriotic associations still exist with great vitality: in 1902 they set up at Eisenach a permanent monument to the movement. See Keil's *Geschichte des jenaischen Studentenlebens* (1858), and Hoyer's *Deutsche Burschenschaften* (1902).

Burslem, former munic. bor. and mrkt. tn., Staffordshire, England, on Grand Trunk Canal, 17 m. N.N.W. of Stafford; the 'mother of the Potteries.' The pottery trade, due to the presence of suitable clay in the district, was begun as early as 1644, when jet (black) and Rockingham (mottled) ware were made. Wedgwood was born in Burslem in 1735, and the Wedgwood Institute was opened in 1869. There are a fine town hall with a lofty clock tower, built in 1865, and a new art school, with valuable collection of Wedgwood pottery. China. Parian, porcelain, ironstone, and black ware are now made chiefly from imported clays. There are also colour works, flint mills, and coal and ironstone mines in the vicinity. Pop. 40,000. In 1910 Burslem and five surrounding boroughs were incorporated to form the new co. bor. of Stoke-on-Trent.

Burstadt, vil. of Hesse, Germany, prov. Starkenburg, 5 m. E. of Worms. Pop. 5,500.

Bürstenbinder, ELISABETH. See WERNER, ELISABETH.

Burt, RIGHT HON. THOMAS (1837), English labour leader, born in Northumberland, and M.P. for the Morpeth division of Northumberland since 1874, went to work in a coal mine when he was ten years old, and in 1865 was elected secretary of the Northumberland Miners' Mutual Confidence Association. In 1882 he was president of the Miners' National Union, and nine years later occupied the presidential chair at the Trades Union Congress in Newcastle. When, in 1890, the German emperor convened the Labour Conference at Berlin, Mr. Burt was chosen one of the British representatives. From 1892 to 1895, in the Home Rule government, he was parliamentary secretary to the Board of Trade. In 1906 he was made a Privy Councillor. See *Life* by A. Watson (1908).

Burton, SIR FREDERIC WILLIAM (1816-1900), artist in water colours, was born in Co. Clare, Ireland, and at Dublin won a reputation as a painter of portraits in water colour. He lived in Munich from 1851 to 1858, and succeeded Sir W. Boxall as director of the National Gallery in 1874. He was knighted on his retiring in 1894. He published a catalogue of the foreign pictures in the gallery (1890), with critical and biographical notices of the artists. See *Magazine of Art*, May 1900.

Burton, JOHN HILL (1809-81), Scottish historian and author, was born at Aberdeen, where he studied. A good deal of hack-work preceded his biography of David Hume (1846), by which he gained distinction. The first portion of his *History of Scotland* appeared in 1853, and the

work was completed in 1870, in 7 vols. It shows great industry and learning, a sound and impartial judgment, but is wanting in imagination. In 1854 Burton was appointed secretary to the Prison Board of Scotland, and subsequently historiographer for Scotland. He was a constant contributor to *Blackwood*, in which the substance of both *The Book-Hunter* (1860) and *The Scot Abroad* (2 vols. 1862) appeared. A Memoir by his widow is prefixed to the large paper edition of *The Book-Hunter* (1882).

Burton, SIR RICHARD FRANCIS (1821-90), English traveller, linguist, and author, was born in Hertfordshire. Entering the E. India service in 1842, he explored the Nilgiri Hills, served for five years in Sindh with Sir C. Napier, and in 1851 published his first important work, *Sindh, or the Unhappy Valley*, supplemented by a volume describing the races inhabiting the valley of the Indus. Returning to England, he soon set out (1853) for Arabia, to visit the cities of Mecca and Medina. Burton, who spoke Arabic like a native, assumed the character of a wandering dervish, and succeeded in penetrating to the holy shrines. The account of his adventures, entitled *Narrative of a Pilgrimage to El Medinah and Meccah*, appeared in 1855-6. Then he turned his attention to Africa, and after a perilous journey to Harar in Somaliland, he started in 1856 with Captain Speke from Zanzibar, and penetrated to the lake regions of Central Africa, discovering Lake Tanganyika in 1858. He had already published his *First Footsteps in E. Africa, or an Exploration of Harar* (1856); and in 1860 he issued *The Lake Regions of Central Africa*. After this he was British consul successively at Fernando Po (1861), Santos in Brazil (1865), Damascus (1869), and Trieste (1871). The

outcome was the issue of various books—e.g. *Wonderings in West Africa* (1863); *Abokuta and the Cameroon Mountains* (1863); *Explorations of the Highlands of Brazil* (1869). Among other works he wrote *The Book of the Sword* (1884); *Camoens: his Life and his Lusiads* (5 vols. 1880-1); and a new and literal translation of the *Arabian Nights*, under the title of *The Thousand Nights and a Night* (16 vols. 1885-8). An expurgated edition was issued by his wife (1886), Isabel Lady Burton, who accompanied him in his later travels, assisted him with his writings, and herself published *Inner Life of Syria, Palestine, etc.* (1875), and *Arabia, Egypt, India* (1879). Burton was knighted in 1886. See the *Early, Public, and Private Life of Sir R. F. Burton*, by Francis Hitelman (1887); *Life of Captain Sir R. F. Burton*, by Lady Burton (2nd ed. by W. H. Wilkins, 1898); *The True Life of Sir R. F. Burton*, by Georgiana M. Stisted (1896); *Sir Richard Burton*, by Thos. Wright (1906); and *The Real Sir Richard Burton*, by W. P. Dodge (1907).

BURTON, ROBERT (1577-1640), English scholar, was born at Lindley, Leicestershire. He became (1599) a student of Christ Church, and obtained the college living of Oxford St. Thomas in 1616. He was also a fellow of Brasenose College. About 1630 a private patron gave him the living of Segrave in Leicestershire, but he continued to reside in Christ Church. In 1606 he wrote a Latin comedy called *Philosophaster*, which he had acted in Christ Church hall in 1618. It is a witty picture of an imaginary university (in Spain) of charlatans, and is much above the average of neo-Latin plays. In 1621 Burton published that singular *olla podrida* of erudition and nonsense, the model of Sterne's *Tristram Shandy* and Southey's *Doctor*,

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the *Anatomy of Melancholy*. The English is quaint, familiar, and picturesque. With inordinate digressions and innumerable quotations, Burton ambles pleasantly through the elaborate divisions and subdivisions of his theme, treating successively of the causes and symptoms of melancholy, of the cure of melancholy, of love melancholy, and the melancholy of religion. Works: *Philosophaster*, ed. W. E. Buckley (1862); *Anatomy of Melancholy*, ed. A. R. Shilleto (1893). Portrait at Brasenose College (reproduced by Shilleto).

BURTON-ON-TRENT, par., co. bor. (1901), munic. bor. (1878), Staffordshire and Derbyshire, England, on the Trent, 11 m. s.w. of Derby. The fine quality of the water, containing sulphate of lime, and derived from the Keuper (Triassic) marls of the district, has made Burton the English metropolis of beer. There are some eighteen breweries in the place, employing over 6,000 people, the largest being those of Bass and Allsopp. In addition to the brewing industries, there are engineering works; fireclay is found in the neighbourhood, and plaster and cement are made. The town has frequently suffered from Trent floods, the latest being that of 1875. There are eight recreation grounds and various literary institutions in the place. Pop. 55,000. See Molyneux's *History of Burton-on-Trent* (1869).

BURTRASK, tn., Västerbotten gov., Sweden, 50 m. N. by E. of Umeå. Pop. (comm.) 8,500.

BURTSCHIED, former tn. of Rhenish Prussia, with cloth factories, needle works, etc., and hot mineral springs. It is now united to Aachen. See AACHEN.

BURU, or **BULU**, isl. of the Dutch E. Indies, situated between New Guinea and Celebes, and almost entirely surrounded by coral reefs,

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It is mountainous, reaching an alt. of 8,250 ft. in Mt. Tomahu and Mt. Siel, but fertile. Principal products are cajeput oil and sago, with bamboos, rattan, betel nut, tobacco, and coffee. Area, 3,425 sq. m. Pop. about 20,000, mostly heathen Alfuras. Cap. Kajeli, or Cajeli.

Burujird, cap. of Irak-Ajemi prov., Persia, 70 m. S.S.W. of Hamadan; has manufactures of cottons and felts; important trading centre. Pop. 25,000.

Burwood, munic. tn., New South Wales, 7 m. W. of Sydney, of which it is a residential suburb. Pop. 7,500.

Bury, munic. and co. bor. (5,835 ac.), parl. bor., and mkt. tn., Lancashire, England, on the Irwell, 9 m. N. by W. of Manchester. An important centre for woollen manufactures, introduced by the Flemings in the time of Edward III., it is now also a busy cotton town, with spinning and weaving mills, calico-printing works, bleach and dye works, paper-mills, foundries, and engineering establishments. The fly-shuttle was invented here by John Kay. Coal mines and free-stone quarries are numerous in the neighbourhood. An excellent technical school was erected in 1894, and the town possesses the valuable Wrigley art collection. A bronze statue commemorates Sir Robert Peel, born near the town in 1788. Pop. 60,000.

Bury, JOHN BAGNAL (1861), historian, was educated at Trinity College, Dublin, of which he was fellow from 1885 to 1902, in which year he succeeded Lord Acton as regius professor of modern history at Cambridge. Amongst his publications are *History of the Later Roman Empire from Arcadius to Irene* (1889), *History of Greece to the Death of Alexander the Great* (1900), his justly renowned edition of Gibbon's *Decline and Fall* (6 vols. 1896-1900), and *Life of St. Patrick* (1905).

Bury, RICHARD DE. See AUNGERVILLE.

Burying Beetles (*Necrophorus*), insects of the family Silphidae, which have the remarkable habit of making excavations under the dead bodies of small vertebrates, so as to bury them, several individuals combining in this work. In the buried carcass the females lay their eggs, so that an abundant food supply is ensured to the emerging larvae.

Bury St. Edmunds, munic. and parl. bor., W. Suffolk, England, 23 m. N.W. of Ipswich. Its churches date from 1005 and 1200. It was a place of great importance in Saxon times, and capital of E. Anglia, and is said to have been the Villa Faustina of the Romans; but its present name is due to the burial in it of the murdered and canonized King Edmund (870). St. Edmundsbury, as it was then called, became a place of pilgrimage. To Edmund's memory Canute erected the Benedictine abbey (commenced in 1020 and consecrated in 1032), whose magnificence is attested by the gateways, arches, and Norman tower. Moyse's Hall, or Jews' House, dating from the end of the 11th century, has been converted into a museum. The botanic gardens, 12 ac. in extent, are entered from the abbey gate. The churches of St. Mary and St. James are interesting buildings. There is a large trade in agricultural produce, and the manufacture of agricultural implements is an important industry. Pop. 16,000. See *Bury St. Edmunds with its Surroundings* (1907), Barker's *History of Bury St. Edmunds*, and Astley's *Bury St. Edmunds* (1907).

Busa. See BOUSA.

Busaco, hamlet of Portugal, 12 m. N. of Coimbra, with remains of a monastery founded in 1268. On the heights of Busaco, Wellington repulsed a fierce attack made by Massena on Sept. 27, 1810.

Büsbach, vil. of Rhenish Prussia, 6 m. E. of Aachen; has textile manufactures. Pop. 7,500.

Busby. See UNIFORM.

Busca, tn., Italy, prov. of and 10 m. N.W. of Cuneo; has marble and alabaster quarries. Pop. (comm.) 9,000.

Busch, CARL (1862), Danish musical composer, born at Bjerre in Jutland; conducted concerts of his own compositions in Leipzig and Dresden (1898); he afterwards went to the United States, and continued his professional work. His works include *Orchestral Prologue to Tennyson's 'The Passing of Arthur,' Elegy for Stringed Orchestra, The League of the Alps, The Lady of Shalott, The Voice of Spring*, etc.

Busch, JULIAN HERMANN MORITZ (1821-99), called 'Bismarck's Boswell,' was a native of Dresden. In 1848 he entered political life; but despairing of reforms after the suppression of the revolutionary movements, he emigrated to America in 1851. Returning early in 1852, he published an account of his travels in *Wanderungen zwischen Hudson und Mississippi* (1853). Next year he made extensive travels in the Nearer East, descriptions of which are to be found in *Eine Wallfahrt nach Jerusalem* (1860; 3rd ed. 1881), *Bilder aus dem Orient* (1862), and *Bilder aus Griechenland* (1863). From 1856 he was a constant contributor to the *Grenzboten*, the organ of the Nationalist party, and in 1866 entered the service of the Prussian government. Called to Berlin in 1870, he became one of Bismarck's press agents, and held this position throughout the Franco-German war. His memory rests upon his works on Bismarck, which include *Bismarck und seine Leute während des Krieges mit Frankreich* (1899), in the form of a diary; *Unser Reichskanzler* (1884; Eng. trans. 1884); and *Tagebuchblätter* (Eng.

Memoirs of Prince Bismarck, 1870-93, 3 vols. 1898), a diary kept during twenty-five years' close intimacy with the chancellor. The book roused much ill-feeling in Germany.

Busch, WILHELM (1832-1908), German cartoonist, was born in Wiedensahl in Hanover. His gifts first excited notice in contributions (collected as *Bilderbogen*, 1875) to the well-known weekly, *Fliegende Blätter*, in 1859. He published a number of tales in doggerel, illustrated by himself; the most famous being *Max und Moritz* (1865). He also wrote a volume of poems, *Kritik des Herzens* (1874), and a short story, *Der Schmetterling* (1893), which tells how the idealist chased a butterfly and became a cripple. His works were collected and published under the title of *Humoristischer Hausschatz*.

Büsching, JOHANN GUSTAV (1783-1829), German man of letters, was born in Berlin; archivist in Breslau (1811), and professor of antiquities there (1816). With Von der Hagen he edited *Deutsche Gedichte des Mittelalters* (1808-25), *Sammlung Deutscher Volkslieder* (1807), *Grundriss zur Geschichte der Deutschen Poesie* (1812), and other works; and alone, *Erzählungen, Dichtungen, Fastnachtsspiele und Schwänke des Mittelalters* (1814).

Buschmann, JOHANN KARL EDUARD (1805-80), German philologist, born at Magdeburg. After a voyage to Mexico (1827-8), he assisted the Humboldts in the preparation of their works, and became librarian of the Royal Library at Berlin (1832), and a member of the Academy of Science (1851). Buschmann is remembered for his philological researches in Malay-Polynesian and S. American languages. His most important works (exclusive of those with the Humboldts) are *Ueber die aztekischen Ortsnamen* (1853), *Die Spuren der*

aztekischen Sprache in nordlichen Mexico (1859), *Die Völker und Sprachen Neumexikos* (1858), *Der Athapaskische Sprachstamm* (1856), and *Das Apache und der Athapaskische Sprachstamm* (1860-63). After the death of Wilhelm von Humboldt he edited and completed that author's well-known work, *Ueber die Kavisprache*, the third volume of which was entirely the work of Buschmann.

Bush, a word in general use in Australia, New Zealand, and Africa, to denote land covered with brushwood.

Bush Antelope, or **BUSH BUCK** (*Tragelaphus sylvaticus*), a small ungulate found in S. Africa, belonging to the group of harnessed antelopes, but without the white stripes usually present in these.

Bushel. See WEIGHTS AND MEASURES.

Bushey. (1.) Par. and urb. dist. (3,081 ac.), Hertfordshire, England, 2 m. S.E. of Watford; has an art school founded by Sir Hubert von Herkomer in 1882. Pop. 4,500.

(2.) **BUSHY PARK**, a royal park (1,110 ac.) on the Thames, par. of Teddington, Middlesex; was the residence of William IV. and Queen Adelaide, and is noted for its chestnut and lime trees.

Bushido ('the way of the warrior'), the ethical code of the Samurai of feudal Japan. It inculcates justice, courage, loyalty, politeness, truthfulness, honour, and self-control—even to the consummation of suicide (*hari-kari*). It gives high ideals and training, and is still powerful in the regulation of the life and institutions of the Japanese people. See Inazo Nitobé's *Bushido: Soul of Japan* (10th ed. 1905).

Bushire, **BUSHAHIR**, or **BANDAR BUSHIRE** (properly **ABU-SHEHR**), seapt. city on E. shore of Persian Gulf. Vessels drawing 13 ft. of water can enter the inner harbour, but larger vessels anchor in the outer roads 6 m. off.

Originally a fishing village, it was chosen by Nadir Shah as a naval port and dockyard, and to it was transferred the E. India Company's station from Coimbroon. The climate is sultry, and the town suffers from lack of good water. The chief exports are opium, gum, carpets, hides and skins, tobacco, raw cotton, mother-of-pearl, rose-water, wool, and horses, the total value being £400,000 per annum. The total imports are valued at about £700,000 per annum, the chief articles being cotton goods, specie, sugar, tea, silk goods, indigo, copper, kerosene. A British government department, 'the Indo-European Telegraph Department in Persia,' works the 675 m. of line with 3 wires between Bushire and Teheran. Pop. 25,000.

Bushmen, the true aboriginal people of S. Central Africa, now confined mainly to the Kalahari Desert, though it would appear that formerly they ranged as far north as Iako Tanganyika. They are known as *Rosjemans* or *Bosjesmans*—i.e. 'Bushmen'—to the Dutch, as *Saan* or *Zaan* to themselves, and as *Aba-tua* and *Makan-tu* to their native neighbours. 'Hottentots,' says Professor Keane, 'are fundamentally Bushmen, modified by crossings with the Negro and Negroid peoples advancing from the north. Though socially lower than the Hottentot, the Bushman has a greater share of natural intelligence; and rock pictures, some of which suggest actual portraiture, give evidence of considerable artistic taste and skill, and are correct in perspective. The Bushmen are a small, spare, wizened race of exceedingly hardy hunters and trappers, armed with bows and poisoned arrows, sheltering in holes or in caves. They stand at the lowest stage of human culture, with no sense of property,

social organization, religion, marriage rites, and family ties. Their language is characterized by 'clicks,' and their conversation to the European ear resembles 'the cackling of geese.' The above description refers to the Bushmen as untouched by civilization. In Bechuanaland they have adapted themselves to the superior civilization of their masters. See *Journal of the Anthropol. Institute* (1882, 1883); A. H. Keane, 'S. Africa,' in *Stanford's Compendium of Geography* (new ed. 1904); G. Bertin, 'The Bushmen and their Language,' *Journal of the Royal Asiatic Society*; W. H. J. Bloek's *Bushman Folklore* (1875); F. C. Selous's *African Nature Notes and Reminiscences* (1908); and Thcal's *History and Ethnography of South Africa* (1910).

Bushnell, HORACE (1802-76), American theologian, born in Litchfield, Conn.; became pastor of the N. Congregational church, Hartford, in 1833. His book, *God in Christ* (1849), denying the adequacy of language to express spiritual truth, involved him in a charge of heresy, to which he replied in *Christ in Theology* (1851). Another important work is *Nature and the Supernatural* (1858). His select works appeared in 8 vols. in 1876-7. See *Life* by Cheney (1880) and by Munger (1899).

Bushrangers was the term applied in Australia to the brigands or outlaws who infested the outlying settlements in Australia during the first three-quarters of the 19th century. They were at first escaped convicts, who had taken to the bush, and maintained themselves by preying on the lonely settlers. They were banded together in large numbers; but the Bushranging Act of 1830 (renewed in 1834), a very drastic measure, put a stop to bushranging on a large scale. The most notable

of these desperadoes were the Kelly brothers, who began their career of crime as cattle-stealers. In 1879 they pillaged Jerilderie, New South Wales, and repeated the exploit in 1880 at Glenrowan, Victoria; but they were shortly after brought to bay, and, though wearing coats of mail, were shot down, the leader being captured alive and afterwards hanged. See Henry Kingsley's *Geoffrey Hamlyn* (1859), and Boxall's *Australian Bushrangers* (2nd ed. 1902).

Bush-shrike, or ANT-SHRIKE (*Thamnophilus*), the name of several species of S. American passerine birds of the Formicariidæ. They are retiring in habit, frequenting dense thickets, and feed on insects, ants, grubs, eggs, etc.

Busiris, a mythical king of Egypt, and reputed founder of the city of Zeus, or Thebes. He was killed by Hercules. Milton (*Paradise Lost*, i. 307) applies his name to the Pharaoh who was overwhelmed in the Red Sea.

Busk, tn., Galicia, Austria, on the Bug, 30 m. E. by N. of Lemberg. Pop. (comm.) 6,700.

Busk, HANS (1815-82), English barrister, was called to the bar at Middle Temple (1841), and was high sheriff of Radnorshire (1847). He took a prominent part in the institution of the volunteer forces. The success of the movement was largely due to his practical treatises, especially *The Rifleman's Manual* (1858; 7th ed. 1860), *Company Drill* (1860), and *Rifle Volunteers* (1859; 7th ed. 1860). He was also the first to advocate lifeboat stations, and in 1859 he published *The Navies of the World*, containing suggestions for the development of the British navy.

Busk, RACHEL HARRIETTE (d. 1907), folklorist and traveller, was the sister of the above. Among her works are the *Folklore of Rome* (1874), and a representative collection of the *Folk-songs of Italy* (with contributions by Compà-

retti, 1887). Spanish folk-tales are contained in her *Patruñas* (1870), and two of her books deal with the Tyrolese. See also her *Sagas from the East* (1873).

Buskerud, mountainous co., Norway, chiefly forest and barrenfjeld. Chief towns, Drammen (cap.) and Kongsberg. Area, 5,720 sq. m. Pop. 120,000.

Buskin, a high shoe, strapped under the ankle; especially used as a translation of the Greek *cothurnus*, the thick-soled boot used to increase the stature of tragic actors.

Busley, KARL (1850), German naval writer, born at Neustrelitz; became professor of the Naval Academy at Kiel in 1879. He has taken an active part in awakening in Germany the interest now taken in naval affairs: for example, he was one of the organizers (1882) of the Kiel Week (international regatta), and a founder (1887) of the Yacht Club. He takes also a great interest in aeronautics, and founded in 1903 the German Club for Aerial Navigation. Amongst his works are *Die Schiffsmaschine* (3rd ed. 1891); *Die neuern Schnell dampfer* (1893); *Der Kampf um den Asiatischen Handel* (2nd ed. 1898); *Die moderneren Unterseeboote* (1899).

Busra. See BASRA.

Bussa. See BOUSSA.

Bussanga. See BORGU.

Busseto, tn., Emilia, Italy, 11 m. s. of Cremona. Verdi was born near by. Pop. (comm.) 8,000.

Bussora (BASSORA). See BASRA.

Bust. See SCULPTURE.

Bustard, a name applied to birds of the family Otididae in general, but especially to *Otis tarda*, the great bustard, which was a native of Britain till 1838. It was the largest British land bird, the wing span being eight feet or more. It still exists in many parts of Europe, in N. Africa, and in Asia, and occurs in Britain as an occasional migrant.

Other bustards are widely distributed throughout the Old World.

Busto Arsizio, tn., prov. Milan, Italy, 20 m. N.W. of Milan, with calico and linen manufactures. In the church (1517-22) is a fine altar-piece by Gaudenzio Ferrari. Pop. (comm.) 20,000.

Butan. See BHUTAN.

Butane is the name of the two isomeric paraffins having the formulae $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$ and $\text{CH}_3\text{CH}(\text{CH}_3)_2$. They are both inflammable gases, the first condensing to the liquid state at 1°C. and the second at 17°C.

Butcher, SAMUEL HENRY (1850-1910), late professor of Greek at Edinburgh University (1882-1903), was born in Dublin, and from 1906 till his death was M.P. for Cambridge University. He published *Prose Translation of the Odyssey*, with Andrew Lang (1889); *Demosthenes* (1881; 2nd ed. 1907); *Some Aspects of the Greek Genius* (1891, 1893); *Aristotle's Theory of Poetry and the Fine Arts, with a Critical Text and Translation of the Poetics* (1895, 1897, 1903, and 1907); *Harvard Lectures on Greek Subjects* (1904). Elected president of British Academy of Letters in 1909.

Butcher-bird, name applied to many species of shrike (*Lanius*), from their habit of impaling their prey on thorns in the vicinity of the nest. The presence of this 'larder' of small mammals, birds, insects, and so on, gives the locality chosen the appearance of a shambles; hence the common name. See SHRIKE.

Butcher's Broom (*Ruscus*), the popular name for a few species of European diceicious shrubs of the order Liliaceae. *R. aculeatus*, the British species, is interesting on account of its leaf-like stems, on which the flower appears. The fruit is a bright-red berry, which when roasted has been substituted for coffee. The plant was used by butchers to sweep their blocks, hence the name.

Bute, isl. in the Firth of Clyde, separated from Argyllshire by the Kyles of Bute, has an area (including Inchmarnock) of 47 sq. m., and is 15½ m. in length, with a varying breadth of 1½ m. to 6½ m. The island is mostly grassy and hilly, with a few woods and plantations. Over three hundred men and boys are engaged in fishing. The climate is mild. Pop. 12,000.

The county of BUTESHIRE comprises the islands of Bute, Arran, the Cumbræ, Mullda, Holy Isle, and Inchmarnock. It has an area of 225 sq. m., or 139,658 ac. The islands, formerly a portion of the Norwegian kingdom, were recovered by Alexander III. after the overthrow of Haco at Largs (1263). Pop. 20,000. The county town is Rothesay. See J. E. Reid's *Hist. of the County of Bute* (1864), and J. K. Hewison's *Isle of Bute in the Olden Time* (2 vols. 1894-5).

Bute, JOHN STUART, THIRD EARL OF (1713-92), the most unpopular minister who ever held office in England, was born in Edinburgh; entered the service of Frederick, Prince of Wales, in 1747, and becoming groom of the stole to the son (George III.) of that prince in 1751, early acquiring great influence over him. After the accession of George III. he readily became the agent of the king in his opposition to Pitt, who had to admit him into his cabinet (1761). For a short period (1762-63) Bute was prime minister, till he was driven from office by the attacks of Wilkes in 1763. He was merely the agent of the king, to whose talents as an adroit politician justice is not always done. He organized for his royal master the corruption fund, and an office was opened at the Treasury for the purchase of members of Parliament for the king's interest. The responsibility for the desertion of Frederick the Great, for the peace of 1763; and for the initiation of a new policy towards

the American colonies, was not his, but the king's. After his fall he continued for some time to exert an influence over the king, but gradually fell back into retirement, devoting himself to scientific pursuits. He was a patron of literature, and gave Johnson an annuity of £300. He married the daughter of Lady Mary Wortley Montagu. (See MONTAGU, LADY MARY WORTLEY) — His fourth descendant, JOHN PATRICK CRICHTON STUART (1817-1900), was born at Mount-Stuart, Isle of Bute, and in 1868 was admitted into the Catholic Church; he distinguished himself as an exponent of Catholicism, was known as a devoted student of Scottish history, and was a munificent benefactor of Glasgow and St. Andrews Universities. His principal works are *The Early Days of William Wallace* (1876), *The Burning of the Barns of Ayr* (1878), *The Roman Breviary* (trans. 1879), *The Coptic Morning Service for the Lord's Day*, and *Altars of St. Columba* (1882).

Butea, a genus of Indian shrubs or small trees of the Papilionaceæ. The resinous sap forms a gum known as 'bengal kino. From the roots and bark of *B. frondosa* (the palas or dhak tree) a useful fibre is obtained, and from the flowers a yellow and orange-red dye. The seed yields moodouga oil, considered a vermifuge by the natives. Lac is obtained from the coccus which frequents the tree.

Butera, tn., Sicily, 9 m. N.N.W. of Terranova. Pop. 7,000.

Butler, bor., Pennsylvania, U.S.A., the co. seat of Butler co., situated 28 m. N. by E. of Pittsburg. It is in the oil region, and is well supplied with natural gas. Manufactures of glass, steel, and flour form the principal industries. Pop. 11,000.

Butler, ALBAN (1711-73), Roman Catholic biographer, educated at Douay, where he became

professor of philosophy and divinity; president of the English College at St. Omer (1768-73). His monumental work, *The Lives of the Saints*, was published 1756-59. It was the result of thirty years' labour. Among the works that appeared after his death were his *Moveable Feasts and Discourses* (1791-3), and *The Life of Sir Tobie Matthews* (1795). See *Life* by his nephew, Charles Butler, *Catholicon*, iv. 184 (1799).

BUTLER, BENJAMIN FRANKLIN (1818-93), American soldier and statesman, was born at Deerfield, Massachusetts. He was a delegate to the National Convention at Charleston in 1860. When the civil war broke out in 1861, he entered Baltimore at the head of a Federal brigade, and was given command of the department of E. Virginia. In May 1862 Butler assisted Admiral Farragut in the reduction of New Orleans; but after its fall he governed the city with such severity that he aroused the undying hatred of the South, which nicknamed him 'Boast Butler.' Recalled and appointed in 1864 to command the department of Virginia and N. Carolina, he co-operated with General Grant in an unsuccessful attack on Richmond. Failing to capture Fort Fisher in December 1864, he was removed from his command for exceeding his instructions. He was returned to Congress by the Republicans of Massachusetts in 1866-79, and was one of the committee appointed to try President Andrew Johnson. He was elected governor of Massachusetts in 1882. See Parton's *General Butler in New Orleans* (1863), *Life* by Bland (1879), and his own *Autobiography* (1892).

BUTLER, CHARLES (d. 1647), English philologist, was born at High Wycombe, Bucks. In 1609 he published *The Feminine Monarchie*, a treatise concerning bees,

which contains a musical interpretation of the summing of a swarm. In 1625 appeared his *Zurzyneua*, dealing with affinity as a bar to marriage; and in 1633 his *English Grammar*, in which he advocated phonetic spelling. His last work was *Principles of Musik in Singing and Setting* (1636).

BUTLER, CHARLES (1750-1832), Roman Catholic and legal writer, and a nephew of Alban Butler, continued and completed Hargrave's edition of *Coke upon Littleton*. His philological and biographical works (5 vols. 1817) contain dissertations on political and legal as well as ecclesiastical subjects, and his valuable letter-books are preserved in the British Museum. For many years he conducted an agitation to enlarge the freedom of English Catholics, but he was successfully opposed by Bishop Milner. See his *Reminiscences* (4th ed. 2 vols. 1824).

BUTLER, CHARLES HENRY (1859), American lawyer, born in New York, was a counsel for the Anglo-American commission for the delimitation of the Alaskan boundary (1898). He is the author of *Cuba must be Free* (1898), *The Voice of the Nation* (1898), *Our Relations with Spain* (1898), *Our Treaty with Spain* (1899), *Freedom of Private Property on the Sea* (1899), and *The Treaty-making Power of the United States* (1902).

BUTLER, LADY ELEANOR (?1745-1829), recluse of Llangollen, Wales, belonged to the house of Ormonde. She and a friend, Sarah Ponsonby, resolved to abandon society, and about 1774 they retired to the vale of Llangollen. Madame de Genlis has given an account of them in her *Souvenirs de Félicie* (1846).

BUTLER, ELIZABETH SOUTHERDEN, LADY, military painter, daughter of Thomas J. Thompson, and sister of Mrs. Alice Meynell, was born at Lausanne, Switzerland. Among her works may be

mentioned *Missing* (exhibited Royal Academy, 1873), *The Roll Call* (1874, purchased by Queen Victoria), *Balaclava* (1876), *Inkerman* (purchased for £3,000 by Fine Art Society, 1877), *Listed for the Connaught Rangers* (1879), *Scotland for Ever and Defence of Rorke's Drift* (1881), *Floreat Etona* (1882), *Evicted* (1890), *The Camel Corps* (1891), *Halt in a Forced March* (1892), *Dawn of Waterloo* (1895), *Steady the Drums and Fifes* (1896), *Tent-pegging in India* (1902), *Rescue of Wounded* (1905), and *A Cistercian Shepherd* (1908). She married in 1877 Major-general Sir William F. Butler. She has written *Letters from the Holy Land* (1903).

Butler, GEORGE (1774-1853), headmaster of Harrow and dean of Peterborough, was born in Pinlicko, London. He was senior wrangler at Cambridge (1794), and held the headmastership of Harrow School from 1805 to 1829, when he retired to the living of Gayton, Northamptonshire. In 1842 he became dean of Peterborough. He translated the *Statutes of Peterborough cathedral* (1853), and compiled a work on the scholars of Harrow (1849).

Butler, HENRY MONTAGU (1833), master of Trinity College, Cambridge, since 1886, was born at Gayton, Northamptonshire, and was senior classic (1855) at Cambridge, headmaster of Harrow (1859-85), dean of Gloucester (1885-6), and vice-chancellor of Cambridge University (1889 and 1890). Among his works are *Sermons Preached in the Chapel of Harrow School* (1861 and 1866); *Belief in Christ, and other Sermons* (1898); *University and other Sermons* (1899); *Public School Sermons* (1899); and *Ten Great and Good Men* (1909).

Butler, JAMES. See ORMONDE.

Butler, JOSEPH (1692-1752), English theologian and apologist, was born at Wantage in

Berkshire. In 1718 he became preacher at the Rolls Chapel, London, where he delivered the *Fifteen Sermons*, published in 1726. In 1721 he became a probandary of Salisbury Cathedral. The bishopric of Bristol was conferred upon him in 1738, and that of Durham in 1750. Butler's fame rests on *The Analogy of Religion, Natural and Revealed, to the Constitution and Course of Nature*, which was published in 1736, and is a development of his *Three Sermons on Human Nature*. In the *Analogy* Butler seeks to show that the results of observation of the facts of nature fall in with the belief in a moral governor for which our consciences call—i.e. that there is an 'analogy' between nature and what he calls natural religion. He further maintains that the facts of observation are consistent with the Christian 'revealed religion;' but in this phase of the question his arguments undoubtedly lack the cogency which characterizes his *apologia* proper. A most acute criticism, from the agnostic point of view, will be found in Leslie Stephen's *English Thought in the 18th Century* (2nd ed. 1880). See Dr. J. H. Bernard's edition of Butler's *Works* (2 vols. 1900), and Gladstone's edition of the *Works* (1897; new ed. 1910), and his volume of *Studies* (1896); also *Butler*, by W. L. Collins (Philosophical Classics, 1880); the *Life* by Dr. Fitzgerald (1849; new ed. 1860); and Dr. T. B. Kilpatrick's edition of *Three Sermons on Human Nature* (1888).

Butler, MRS. JOSEPHINE E. (née GREY) (1828-1906), English author, was born at Milfield, on the Cheviot Hills. Her name was associated with higher education for women, the Married Woman's Property Bill, the repeal of the Contagious Diseases Act, and other social reforms. She wrote

a life of her father, *John Grey of Dilston* (1869), *Woman's Work and Woman's Culture* (1869), *The Constitution Violated* (1871), *Life of Catharine of Siena* (1878 and 1881), *Government by Police* (1879), *Life of Oberlin* (1882), *The Salvation Army in Switzerland* (1884), *Our Christianity Tested by the Irish Question* (1887), *Lady of Shuncu* (1895), and recollections of her husband, *George Butler* (canon of Winchester, d. 1890). See *Autobiographical Memoir*, ed. by G. and L. Johnson (1909).

Butler, NICHOLAS MURRAY (1862), president (since 1902) and professor of philosophy and education, Columbia University, New York. He is a trustee of the Carnegie Foundation, and one of the chief educational authorities in the U.S.A. He has published numerous works on education and philosophy.

Butler, SAMUEL (1612-80), English poet, was born at Strensham, Worcestershire, and educated at Worcester Cathedral School. His first occupation was that of secretary to Mr. Jefferies, Earls-Croome, Worcestershire, where he gained the friendship of the painter Samuel Cooper. He was next in the household of the Countess of Kent at Wroth, Bedfordshire (1628), his duties associating him with John Selden. Then he was at Cople Hoo, Bedford, in the service of Sir Samuel Luke, a stern Presbyterian, and one of Cromwell's officers. Butler, while in this post, probably found poetic material, Luke himself presumably supplying the prototype for *Hudibras*. After the restoration he was secretary to the Lord President of Wales, under whom he was appointed steward of Ludlow Castle (1660). The legend that Butler was secretary to Buckingham when chancellor of Cambridge is scouted by Dr. Johnson, whose attitude is

strengthened by the bitter tone of the 'Duke of Bucks' in the poet's posthumous *Characters*. Powerful friends, including Clarendon, seem to have consistently disappointed him, thereby provoking the strong condemnation of Dryden, Oldham, and Otway. Butler published the first part of *Hudibras* in 1663, the second in 1664, and the third in 1678, and in the end he had not finished his ridicule of fanatical Puritanism. But what he gave is a masterpiece, showing complete command of the iambic tetrameter. Ostensibly a narrative, the poem owes nothing to the story. Its greatness rests on its droll, irresistible satire. The poem is a storehouse of pungent criticisms, terse epigrams, and wise saws. *Don Quixote*, the *Satyre Ménippée*, Cleveland's verses, and the *Musarum Delicie* were all probable sources of inspiration; but direct and forcible originality everywhere prevails. Butler has numerous imitators, but no peers. Spurious *Remains* appeared in 1715, and R. Thyer published from the poet's MSS. *Remains in Prose and Verse* (1759; reprinted 1827). *The Elephant in the Moon, Cat and Puss*, and others have merit, but all are far below *Hudibras*.

Hudibras, with Hogarth's cuts, appeared in 1726. Zachary Grey edited the poem, with notes and preface (1744; 2nd ed. 2 vols. 1764; enlarged ed. 3 vols. with portraits, etc., 1819). Dr. T. Nash published the work with biography and fresh notes (3 vols. 1793; new eds. 1835-40 and 1847). A new edition by A. R. Wallis appeared in 1905. John Towneley issued a French translation (1757; new ed. 1819), with engravings after Hogarth, and a key by Lettlin le Jeune. For the 'Aldine Poets,' Mitford edited *Butler* (1835), also R. B. Johnson (1893). See J. Granger's *Biograph. Hist. of Eng.*, iv. 40 (1769-1806); 'Butler' in

Johnson's *Lives of the Poets* (1779-81); W. Hazlitt's *Eng. Poets* (1846) and *Comic Writers* (1819); H. Morley's *Character Writings of the 17th Century* (1891).

Butler, SAMUEL (1835-1902), author of *Erewhon*, spent some years of his early life in New Zealand. On his return to England he studied painting, and exhibited at the Royal Academy. In 1872 he published anonymously *Erewhon*, a romance in which philosophy and satire are interwoven with a description of an imaginary race whose characteristics and habits are in most respects an inversion of those of our own society. He followed up its success in 1901 with an equally clever sequel, *Erewhon Revisited*. Among his other works are *The Fair Haven* (1873), *Life and Habit* (1877), *Evolution, Old and New* (1879), *Alps and Sanctuaries of Piedmont* (1881), *Ex Voto* (1888), a *Life of Bishop Butler* (1896), the *Authoress of the Odyssey* (1897), a contention that the *Odyssey* was written by a woman, and an edition of Shakespeare's *Sonnets* (1899). He also published various musical compositions in collaboration with H. Festing Jones. In 1903 *The Way of All Flesh*, a novel written thirty years before, was published posthumously. His *Essays on Life, Art, and Science* were edited by R. A. Streatfield in 1904.

Butler, or BUTTLER, WALTER (c. 1600-34), promoter of the plot which resulted in the assassination of Wallenstein (1634), was a scion of the Irish Butlers (Ormonde). He enlisted as a private adventurer in the imperial army, and worked his way up to be colonel. After having assassinated Wallenstein at Eger, together with a fellow-countryman, Devereux, and two Scotsmen, Gordon and Leslie, he was created by the emperor a count of the empire and a major-general.

Butler, WILLIAM ARCHER (?1814-48), professor of moral philosophy in the University of Dublin, was born near Clonmel, of an old Irish family. When a student he contributed a number of poems and essays to the *Dublin University Review*. In 1837 he was appointed to the newly-instituted chair of moral philosophy. His principal works are lectures on the *History of Ancient Philosophy* (2 vols. 1856), and *Sermons, Doctrinal and Practical* (2 vols. 1849, 1856). See *Memoir* by Woodward, prefixed to *Sermons* (1849); *Dublin Univ. Rev.*, May 1842, July 1849.

Butler, SIR WILLIAM FRANCIS (1838-1910), Irish soldier and author, was born in Suirville, Tipperary; served in the Red River expedition (1869-70); went on a special mission to the Saskatchewan territories (1870); commanded the W. Akim native forces in Ashanti expedition (1873); was special service officer under Wolseley in Natal (1875); again served under Wolseley in the Sudan campaign (1884-85); brigadier-general in Egypt (1892-93). On his return to England in 1893 he was raised to the rank of major-general, and received a command at Aldershot. He commanded the troops at the Cape in 1898-9, and was chairman of the S. Africa War Stores Commission (1905). In 1906 he received a G.C.B. In 1877 he married Elizabeth Thompson (Lady Elizabeth Butler), the painter. He is author of *The Great Lone Land* (1872), *The Wild North Land* (1873), *Akimfon* (1875), *Far Out* (1880), *Red Cloud, the Solitary Sioux* (1882), *The Campaign of the Cataracts* (1887), *Charles George Gordon* (1889), *Sir Charles Napier* (1891), *Life of Sir George Pomeroy Colley* (1899), and *From Naboth's Vineyard* (1907), a volume of S. African impressions. See *Autobiography*, edited by his daughter (1911).

Butlerage, an old English duty, whereby every ship importing over twenty tuns of wine was taxed two tuns for the crown. The duty, which was changed to a tax of two shillings on every tun in the reign of Edward I., was payable to the king's butler, whence the name.

Buto, an Egyptian goddess, specially honoured at Buto, north-east of Sais, her oracle being one of the most celebrated in Egypt. She was identified by the Greeks with Leto, the mother of Apollo. Her older name was Uto, and she was represented as a serpent, sometimes with wings, and wearing the red crown of Lower Egypt.

Butomus, a genus of hardy aquatic plants of the Alismaceæ, from two to three feet high, with slender triangular leaves and pink flowers, natives of Europe. See **FLOWERING RUSH**.

Bütow, tn., Pomerania, Prussia, 26 m. S.E. of Stolp. Pop. 7,000.

Butt, CLARA (1873), English singer, born at Southwick, Sussex; made her début in R.C.M. students' performance of *Orfeo* at the Lyceum Theatre (1892). She is the leading British platform contralto. In 1894 she sang at the Handel Festival, and in 1900 she married the singer, Kennerley Rumford.

Butt, ISAAC (1813-79), Irish politician, was born at Glenfin in Donegal. A successful barrister, he offered a strong opposition to O'Connell. But about 1852 his political opinions changed, and in 1871, when he represented the city of Limerick in Parliament, he was chosen leader of the Home Rule party. Among his writings are *The Transfer of Land by Means of a Judicial Assurance* (1857), *Home Government for Ireland* (1874), and *The Problem of Irish Education* (1875).

Butte, the largest city of Montana, U.S.A., the co. seat of Silverbow co. It lies in a pic-

turesque region of the Rocky Mts. at an alt. of 5,700 ft., and about 47 m. S.S.W. of Helena. Butte is the seat of several of the largest gold, silver, and copper mining companies in the United States, the mines of the region being among the richest in the country. The vast smelters of the Anaconda mine are about 25 m. distant. Pop. 40,000.

Butter consists of the coalesced globules of butter fat, along with small quantities of the other constituents of milk, and varying quantities of water. The exact chemical composition of butter will vary with the method of manufacture and the time of year; but the following analysis indicates the average composition of butter of good quality:—

	Fresh Butter.	Salt Butter.
Water.....	14.50	12.80
Fat.....	83.38	84.06
Curd.....	0.80	0.67
Milk sugar.....	1.12	0.69
Ash.....	0.2	1.78

Butter can be prepared directly from the whole milk, but the process involves considerable expenditure both of time and of labour, so that it is usual to separate the cream first either by mechanical separators or by the ordinary process of skimming in shallow pans. The fat being the lightest portion of the milk, and being only mechanically mixed with the other constituents, tends to rise when the milk is allowed to remain at rest. This natural separation is retarded, firstly, by the current set up in the cooling milk; secondly, by the semi-solid condition of the casein. In summer the milk is allowed to stand for twelve hours, and in winter for at least eighteen hours, before skimming or creaming. It has long been known that slightly sour cream churns more readily than fresh, but the cause of the difference is not well un-

derstood. Some butter-makers are of opinion that fresh cream makes the best butter; but the majority are in the habit of allowing the cream to sour, or, as it is termed, 'ripen.' The subsequent flavour and aroma of the butter depend mainly on the extent of the ripening; for not only is lactic acid produced, but a number of bacteria appear, and the decomposition products of these micro-organisms affect to a large extent the character of the butter.

The temperature of the dairy has a considerable influence on bacterial growth, and therefore indirectly on the character of the butter. In cold weather the lactic ferment becomes somewhat dormant, and an organism appears in the cream which produces a peculiar bitter taste. On the other hand, if the temperature is too high the butter tends to become rancid. The ripening process, therefore, is one which demands great skill and care. The next stage in the process is churning, in which the ripened cream is agitated by mechanical means until the fat globules coalesce. Temperature has a most important influence on this operation. Too low a temperature retards the production of the butter, while too high a temperature or too rapid churning causes the solid butter grains to enclose liquid fat. The best temperature for churning ripened cream is from 57° to 61°F. When the butter grains are about the size of sago the process is stopped; for if continued longer the butter forms lumps, from which it is almost impossible to remove the buttermilk. The buttermilk is now drawn off, and the residual butter washed in the churn with cold water; it is next removed to the butter-worker, where it is pressed to remove the water; and it is then ready to be made up into rolls or other form for market.

In preparing salt butter, brine is substituted for plain water for washing; the butter is afterwards mixed with more salt in the mechanical butter-worker. The amount of salt added varies according to requirements. If it is to be used at once, half an ounce to the pound of butter is sufficient; but if it is intended to be kept for some time, as much as one ounce to the pound will be required, and much more is often used. Butter salted in Britain in April and in May requires more salt than that prepared at other periods of the year. This is due to the fact that cows are changed at this time from stall feeding to grass. It is usually calculated that one pound of butter is furnished by from twenty-two to twenty-four pints of milk. The liquid which drains away from the butter in the churn is called buttermilk. The composition of this liquid differs from that of milk, inasmuch as nearly all the fat has been removed, and a portion at least of the milk sugar has been converted into lactic acid. The amount of fat present will depend on the care with which the butter has been prepared, but it should not be more than three-tenths per cent. Butter fat differs from other fats, either of vegetable or animal origin, in several important particulars. All fats, chemically considered, are glycerides of fatty acids; that is to say, they are capable of being decomposed in the presence of water into glycerin and fatty acids. Different fats vary both in the nature of the fatty acids produced and in the relative proportion of glycerin and acid. In the case of butter fat, the fatty acids are high and the glycerin proportionally low; the fatty acids usually amount to at least 91·5 per cent., of which at least 5 per cent. are volatile.

The following distinct glycerides are known to be present in butter fat—viz. stearin, palmitin, olein, butyrin, capronin, caprylin, caprin, laurin, myristin, and butin. See DAIRYING.

Butter, ROCK, a combination of alum and iron, soft and greasy to the touch, and having the appearance of butter, which exudes from aluminiferous rocks.

Butter-bur, the popular name of *Petasites vulgaris*, a plant of the Compositæ, growing in swampy ground, common in Britain. The pink flowers are on short, thick, erect stalks, and appear before the immense broad leaves resembling those of rhubarb.

Buttercup, a name applied to various species of *Ranunculus*, with cup-shaped, glistening yellow flowers.

Butterfield, WILLIAM (1814-1900), English architect, who did much to revive Gothic architecture, and largely developed the use of colour in ecclesiastic buildings by the aid of brick, marble, mosaic, and painted tiles. He was the designer of St. Augustine's College, Canterbury; Keble College, Oxford; the grammar school, Exeter; the chapel, quadrangle, etc., Rugby; All Saints' church, Margaret Street, London; St. Alban's, Holborn; St. Augustine's, Queen's Gate; and St. Thomas's, Leeds.

Butterfish, or **GUNNEL** (*Centronotus gunnellus*), a small fish belonging to the same family as the blennies, very common in shore pools. It owes its common name to the elongated, slippery form, which makes it exceedingly difficult to catch. Very characteristic are the black spots, placed at either side of the long dorsal fin, by which and its shape the fish can be readily recognized.

Butterflies constitute, together with moths, the large insect order Lepidoptera. From moths butterflies are not very

definitely separated, but, as the scientific name of *Rhopalocera* indicates, the latter have club-shaped antennæ, while the antennæ in moths vary greatly in shape. Further, in butterflies the posterior wings have a characteristic projecting shoulder, and this vein or nervure of those wings, which is called costal by entomologists, is strongly curved at its base. When at rest most butterflies fold their wings, so that the under surface only is visible, while moths do not. A distinction which is often made much of by popular entomologists, that the butterflies are diurnal and the moths nocturnal, is not reliable, for some moths fly by day. In general life, habits, and structure there are no striking differences between moths and butterflies. See LEPIDOPTERA.

Butterflies, or *Rhopalocera*, are divided into the following families: (1) *Nymphalidæ*; (2) *Erycinidæ*; (3) *Lycenidæ*; (4) *Pieridæ*; (5) *Papilionidæ*; (6) *Hesperiidæ*. Of these families the first is the largest, containing between 4,000 and 5,000 species, while the *Papilionidæ* contains perhaps the most beautiful forms. Among the *Nymphalidæ* are included the *Danaides* and the *Ithomiides*, butterflies with a relatively simple type of coloration, interesting because the theory of mimicry was largely based on the resemblances between them and other unrelated butterflies. The *Danaides* and *Ithomiides* are stated to be inedible and distasteful to birds, while their colour analogues (mimics) are believed to be edible. To the family *Nymphalidæ* belong also such common British forms as the species of *Vanessa*—e.g. the red admiral, the tortoise-shells, the peacock, Camberwell beauty, and so on, as well as the fritillaries and the purple emperor. In it are also included the remarkable leaf but-

terflies (*Kallima*), in which the under surface, in shape, colour, and markings, closely resembles a dead leaf, while the upper surface is brightly coloured. Like other butterflies, *Kallima* folds its wings on alighting, so that only the under surface is visible. The family Erycinidae includes small butterflies with only one British species, the Duke of Burgundy fritillary (*Nemeobius lucina*). Among the Iycenidae are included the 'blues,' so called from the colour of the upper surface. The Pierida include the common cabbage butterflies, or garden whites. They are remarkable for the prevalence of white, yellow, and orange colours, and for the fact that these tints are due to uric acid, or derivatives of this substance, stored in the wings as a pigment. The caterpillars are simple and unspecialized; they are often green in colour, a tint apparently due to the colouring matter of the food. Among the Papilionidae, or swallow-tails, the females are strikingly different from the males, and though larger, do not display the same beauty of coloration. The members of the family are widely distributed. The family Hesperidae, or skippers, includes insects very different from other butterflies, both in structure and habits. The adults have in many cases a very rapid but jerky method of flight, and the larvae in their habits resemble moths rather than butterflies.

For general accounts of butterflies, see 'Insects,' vol. ii. in the *Cambridge Nat. Hist.*, by J. Sharp (1899), and Kirby's *Elementary Text-book of Entomology* (1885). British butterflies may be identified from F. O. Morris's *Hist. of British Butterflies* (1853), and their caterpillars from *The Larvæ of British Butterflies and Moths* (8 vols., Ray Society, 1886). For the theory

of mimicry in relation to butterflies, see *A Naturalist on the Amazons*, by H. W. Bates (5th ed. 1884), and A. R. Wallace's *Darwinism* (1889). For the colours, see E. B. Poulton's *Colours of Animals*, 'International Science Series' (1890); and for the pigments of the wings, M. I. Newbigin's *Colour in Nature* (1898).

Butterfly Orchis, the popular name of two common British orchids, *Habenaria bifolia* and *H. chlorantha*, growing in heaths and thickets. *Oncidium Papilio*, a W. Indian orchid, is known as the butterfly plant, from its close resemblance to the insect.

Butterfly Weed, or PLEURISY ROOT (*Asclepias tuberosa*), a N. American herbaceous plant of the Asclepiadaceæ. The root is used as a purgative, diuretic, and expectorant; also, infused, as a remedy for pleurisy and rheumatism.

Butter-making. See DAIRY-ING AND BUTTER.

Butternut (*Juglans cinerea*), an American tree of the Amelanchiæ, allied to the walnut. The wood, dark yellow in colour, takes a fine polish, and is used in cabinet work; the bark yields a brown dye, and the nuts contain oil.

Butter-tree, trees of the genus *Bassia* of the Sapotaceæ, and other trees in different orders, the seeds of which yield a quantity of oily fat, used by the natives of India and Africa as butter and lamp-oil, in soap-making, commerce, etc. The native butter described by Mungo Park is supposed to have been obtained from *B. Parkii*, or other Central African species of *Bassia*.

Butterwort, the popular name of *Pinguicula vulgaris* of the Lentibulariaceæ, common in Britain and Europe, growing on wet ground. It is apparently stemless, with a number of radical yellowish-green fleshy leaves covered with small glands secreting a sticky digestive fluid

by which small insects are retained. The plant is one of the three British carnivorous plants, and obtains at least a portion of the necessary nitrogen from the digestion of the captured insects. The blue flower is produced on a tall stalk rising from the centre of the plant.

Buttevant, tn. and par., Co. Cork, Munster, Ireland, 20 m. N. by W. of Cork; it is the Mulla of Spenser, the tower of whose castle of Kilcolman stands 3 m. to the N.E.

Butt-joint, a joint (usually between iron plates) in which the two plates are brought to 'abut' together, and are then fastened together by cover-plates.

Buttons, as fasteners of dress, are essentially of modern use; ancient dress, which was of a looser nature than is modern, was wrapped round the body, or fastened with brooches or pins, tied together with strings or held together with girdles. Among the substances from which modern buttons are made are metals, celluloid, ebonite, shell, pearl, bone, glass, papier-maché, wood, jet, precious stones, porcelain, and enamel. Birmingham is the centre of the industry in England. Metal buttons without shanks are made by stamping. Those to which metal shanks are fitted have the disks punched and trimmed, and then attached to the wire shank with a little solder. Cast buttons are made by pouring molten metal into a mould, the loop of wire which forms the shank being suspended in it. For making covered buttons two thin sheet-iron stampings are used—one a circular disk, and the other a smaller black piece, or collet, with a hole in the centre and several sharp points at right angles on the edge. The stuffing, overlaid with strong cloth, is placed on the disk, which is laid on the

covering, the latter being gathered up over the materials. The collet is then forced down, the hooks holding it in position, while the stuffing forces the coarse cloth through the hole to form the shank, through which the needle is passed laterally. Shirt buttons are made of powdered steatite saturated with soluble glass; the mixture is forced into moulds, and is then baked and polished. Many other materials are moulded in a similar way. Buttons made from ivory, wood, and bone are turned on a button lathe. Mother-of-pearl buttons are cut out of the shell by a tubular saw, split, and polished on the lathe.

Buttress, an abutment built outside a wall to relieve the latter of the outward thrust or pressure consequent on the weight of vault or arch. It has many forms, from that of a rectangular pier let into the wall, and usually extending outwards in terraces as it descends to the ground, to that of a free, arch-like structure, or 'flying buttress,' taking the pressure from the wall to solid foundations at a distance from the latter. The pinnacle was introduced to give weight to the buttress.

Buturlinovka (*Petrovskoi*), a township of Voronej gov., Russia, 85 m. S.E. of Voronej, on an affluent of the Don. Mills, tanneries, etc. Pop. about 23,000.

Butyl Alcohol has four isomeric varieties, the normal alcohol, $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$, being a pleasant-smelling, somewhat oily liquid; b.p. 117°C . sp. gr. $^{\circ}82$ at 0°C . Isobutyl alcohol, $(\text{CH}_3)_2\text{CHCH}_2\text{OH}$, is a liquid (b.p. 107°C . sp. gr. $^{\circ}817$ at 0°C .) with a disagreeable smell, which occurs in fusel oil, and is believed to be partially the cause of the toxic action of crude spirits.

Butyl - chloral, $\text{C}_4\text{H}_9\text{CHClO}$, is prepared by passing

chlorine through acetaldehyde. It is an oily liquid (b.p. 165°C ., sp. gr. 1.41 at 7°C .) that unites with water to form a hydrate. The latter is of similar properties to chloral hydrate, but has a specific action in relieving tédouloureux. Under the name 'chloretoné' it is used medicinally—*c.g.* in sea-sickness.

Butyric Acid, $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$, is a fatty acid occurring in butter fat, and in several vegetable fats and oils. It may be prepared by the fermentation of sugar or starch, mixed with water, skimmed milk, and putrid cheese, from which the specific bacillus that causes the action is derived. It is a thick, colourless liquid (b.p. 163°C ., sp. gr. .98 at 0°C .), with a sour taste, and the odour of rancid butter. It is soluble in water, and gives rise to a series of salts and esters, the butyrates. Isobutyric acid $(\text{CH}_3)_2\text{CHCOOH}$ is an isomeric form.

Butyric Ether, or **ESTER**, a general name for compounds formed from butyric acid by the substitution of an alkyl for an atom of hydrogen. Ethyl butyrate (b.p. 120°C ., sp. gr. .90 at 0°C .) is commercially prepared by heating butyric acid, sulphuric acid, and alcohol, and is used by confectioners, as it has a strong pineapple odour.

Bützow, *tn.*, Mecklenburg-Schwerin, Germany, 20 m. S. by W. of Rostock. Pop. 6,000.

Buxa, *BAXA*, or *BOXA*, *tn.*, E. Bengal and Assam, India, 75 m. N.N.E. of Rangpur, near Bhutan border. Pop. 14,000.

Buxar, or **BUSCAR**. See **BAXAR**.

Buxton, *eccles. pa.*, *mrkt. tn.*, and *wat.-pl.* in High Peak div., Derbyshire, England, on the Wye, 22 m. S.E. of Manchester. It has long been popular for its natural hot mineral springs and its healthy position (987 ft. above sea-level). The market-place,

which is seventy feet above the lower part of the town, has an interesting old cross. The natural baths are at the west end, and the hot at the east end, of the crescent. Near the town is the Devonshire Hospital and Buxton Bath Charity for poor patients. Buxton has fine gardens, with pavilion and concert hall, opera house, golf links, and numerous hydro-paths (season, May to September). Lime-working is the local industry. The horse show is important, Buxton being the centre of an important horse-breeding district. Pop. 10,000.

Buxton, **SYDNEY CHARLES**, (1853), English politician and author, is the grandson of Sir Thomas Fowell Buxton, of anti-slavery renown. Mr. Buxton, after serving for six years on the London School Board (1876-82), entered the House of Commons as member for Peterborough (1883-5), and then for the Poplar division of Tower Hamlets (1886), for which he has sat continuously ever since. In 1891 he induced the House of Commons to accept the 'fair wages' resolution, under which it is made obligatory on government contractors to pay to their employes not less than the current rate of wages. In the same year he got the minimum age for the employment of children as half-timers in factories raised from ten to eleven years. In the Home Rule Parliament of 1892 Mr. Buxton was under-secretary for the colonies (1892-5). In December 1905 he was appointed Postmaster-General, with a seat in the cabinet. He was a member of the South African (Jameison Raid) Committee in 1896, and of the Royal Commission on Education (1886-9). In 1910 he became President of the Board of Trade, succeeding Mr. Churchill. Mr. Buxton is the author of a *Handbook to Political Questions* (1880; 11th ed.

1902); *Political Manual* (1880; 9th ed. 1902); *Finance and Politics: an Historical Study* (1889); *Handbook to the Death Duties* (1893); *Mr. Gladstone as Chancellor of the Exchequer* (1901); and *Fishing and Shooting* (1902).

Buxton, SIR THOMAS FOWELL (1786-1845), English philanthropist, who married (1807) a sister of Elizabeth Fry. A speech which he delivered at the Mansion House in 1816, in favour of the Spitalfields weavers, excited deep public interest. Buxton entered Parliament for Weymouth in 1818. He gave a great deal of attention to the state of the prisons, and his pamphlet entitled *Inquiry into Prison Discipline* led to useful reforms. With Wilberforce he next championed, especially from 1824, the cause of the slaves in the W. Indies, and wrote *The African Slave Trade and its Remedy* (1839). He retired from the House of Commons in 1837, and in 1840 was created a baronet. Buxton's attention was also turned to the reform of the criminal code, the civilization of Africa by commercial, agricultural, and missionary enterprises, and the education of the poor and the improvement of their condition. See *Memoir and Correspondence*, ed. by his son (1872).

Buxtorf, JOHANN (1564-1629), German Hebrew scholar, was a native of Kamen in Westphalia. He was appointed professor of Hebrew at Basel in 1590, and became the most learned Hebraist of his time. His earliest book was a manual of Biblical Hebrew, containing a grammar and a vocabulary (1602); then appeared a work on the Jewish synagogue (1603), a lexicon of rabbinical Hebrew (1613), and an important work on the abbreviations employed in this form of the language. But his greatest work, published during his lifetime, was the folio Hebrew Bible, to-

gether with the Targum, and the commentaries of the rabbinical writers, Ben Ezra and Rashi (1618); to this was afterwards added (1620) *Tiberias, sive Commentarius Masorethicus*, giving an account of the Scripture text according to the Jewish tradition. Suddenly cut off by the plague, he left unfinished two important works afterwards completed and published by his son and successor (see below)—viz. a Concordance to the Hebrew Bible (folio, 1632), and a Chaldaic, Talmudic, and Rabbinic Lexicon (1639; new ed. 1866-74). See Diestel's *Geschichte des alten Testaments in der Christlichen Kirche* (1869), and Kautzsch's *J. Buxtorf der Aeltere* (1879).

Buxtorf, JOHANN (1599-1661), son of the above, and his successor (1629) as professor of Hebrew at Basel, edited and extended his father's writings. In a violent controversy with L. Cappel he claimed divine authority for the entire Masoretic text, vowels as well as consonants. These views were set forth in several treatises—*De Litterarum Hebraicarum Genuina Antiquitate* (1643), *Tractatus de Punctorum Origine* (1648), *Anticriticus* (1653), and *Latin Dissertations* (1664). In 1629 he edited Maimonides's *More Na-Nebuchim*.

Buxus. See BOX.

Buys-Ballot. See BALLOT, Buys.

Buys-Ballot's Law, a rule stating the relation between the direction of the wind and that of the barometric gradient. It may be enunciated in the following form: In the northern hemisphere, standing with one's back to the wind, the centre of lowest pressure is to the left hand, in a direction making an acute angle with that in which the wind is blowing. In the southern hemisphere the centre of lowest pressure is to the right hand. In

accordance with this law, the wind blows spirally inwards towards the centre of a cyclone, and spirally outwards from an anti-cyclone. See ANT. CYCLONE, CYCLONE, FERREL'S LAW, WIND.

Buzeu, or BUZAU, tn., Roumania, on river of same name, 60 m. N.E. of Bucharest; see of a bishop. It existed as early as 1350, and was destroyed by the Tartars (1637-9). Pop. 22,000.

Buzuluk, tn., Samara gov., Russia, 107 m. E. by S. of Samara city by rail. Tanneries, copper foundries; trade in horses, cattle, and cereals. Pop. 15,000.

Buzzard, a name applied to birds of prey belonging to the sub-family Buteoninae, distinguished by their rather slow and heavy flight, the short rounded head, and strongly-curved beak. The so-called common buzzard (*Buteo vulgaris*) is now rare as a breeding species in Britain. Buzzards are widely distributed over the globe, but are absent from the Australian region. They live chiefly upon small mammals, but also eat reptiles, young birds, and insects.

B.W.G., or BIRMINGHAM WIRE GAUGE. See WIRE.

By, JOHN (1781-1836), engineer of the Rideau Canal, Canada, served in the Peninsular war, and in 1826 went to Canada, where he constructed the Rideau Canal, between the St. Lawrence and the Great Lakes—a work which cost about a million sterling. Bytown, named after him, was later called Ottawa. See *Pall Mall Mag.*, June 1898.

Byblos, a city of great antiquity on the Phœnician coast, between Berytus and Tripolis; it was the chief seat of the worship of Adonis. See JEBAIL.

Bygdea, comm., Vesterbotten gov., Sweden, on Gulf of Bothnia, 25 m. N.E. of Umeå. Pop. 6,600.

Byker, eccles. par. and township, in city of Newcastle-on-Tyne,

Northumberland, England; manufactures lead, pottery, etc.; has collieries. Pop. 45,000.

By-laws (Dan. *by*, 'a town'). The term is commonly used to signify local laws made by a local governing authority for the regulation of affairs within its own area. In its widest extension it describes any order, rule, or regulation made by an authority subordinate to Parliament, and includes not only the orders and rules made by a chartered company such as the British South Africa Company—for the administration of its territory and the management of its company business, but the articles of association of any limited company. By-laws of a local authority, when duly confirmed by the competent authority (usually the Local Government Board or Board of Trade), have the force of an Act of Parliament. Prior to confirmation the public must be afforded an opportunity of examining them, and opposing them if necessary. By-laws may depend upon custom, charter, or statute. Customary by-laws occur in the regulations of trade guilds, or of boroughs or manors. By-laws resting on charter are made by bodies incorporated by charter, and those dependent on statute derive their authority from a particular Act of Parliament. A valid by-law does not exceed the limits imposed by the enabling power; if dependent on a statute, it has been duly confirmed by the proper authority, and it is reasonable in itself and not contrary to the general law of the country.

Bylazora. See KOPRULU.

Bylini, a name given to the heroic ballads of Russian popular poetry. Besides the legendary heroes, they celebrate historical persons, such as St. Vladimir, Ivan the Terrible, Boris Godunov, and Peter the Great. The popu-

lar bards who transmitted them orally are now only to be found in the remotest provinces of Russia. Although Richard James, chaplain of the English embassy in Russia, collected (1619) a goodly number of them in the 17th century, it was not until the second half of the 19th that interest was keenly aroused in them. They are divided into several cycles, as those dealing with the legendary heroes; the cycle of Kiev, the chief heroes of which are Vladimir and the peasant Ilya Murometz or Ilya from Murom—this is the principal cycle; the cycles of Novgorod, of Moscow, of Peter the Great, etc. The principal collections of *byliny* were made by Ribnikov (4 vols. 1860-71), by Kireievski (1868-74), and by Sobolevskii (6 vols. 1895-1900). Avenarius in 1883 published an anthology of *byliny*. See Rambaud's *La Russie Epique* (1876), Wollner's *Untersuchungen über die Volksepik der Grossrussen* (1879), and Ralston's *Russian Folk-tales* (1873) and *The Songs of the Russian People* (2nd ed. 1872).

Byng, GEORGE. See TORRINGTON, VISCOUNT.

Byng, JOHN (1701-57), English vice-admiral, a son of Admiral George Byng. In 1756 he fought an unsatisfactory action off Minorca, and being convicted subsequently by court-martial of not having done his best, was sentenced to be shot. He was accordingly executed on board the *Monarch* at Portsmouth, on March 14, 1757, as a penalty for his too strict observance of forms, rules of discipline, and points of naval etiquette; there was no imputation upon his honour or his courage. See Charnock's *Biographia Navalis* (1796); Clowes's *Royal Navy* (1896-1901).

By-products. Secondary products produced in the course of manufacturing a principal product are called by-products.

The utilization of by-products, formerly allowed to run to waste, is essentially a modern development, and in certain complex industries by-products now form the main source of profit. The vast importance of by-products dates from the artificial production of aniline colouring matter from coal tar by the English chemist Perkin in 1856. Although the pioneers were English, German chemists subsequently developed this branch of industry in a remarkable degree. The following are some of the more important by-products:—

Alkali and Sulphuric Acid.—In the Leblanc process of preparing sodium carbonate, the hydrochloric acid obtained in the first stage was formerly allowed to escape, and caused much nuisance. This was avoided by collecting it by solution in water, the acid eventually forming one of the most valuable products of the process. The 'alkali waste' also produced, and consisting chiefly of calcium sulphide, was another troublesome by-product, as it not only needed land for its deposit, but also gave off an offensive smell. Of recent years this difficulty has been removed by the recovery of the sulphur; but the methods have now lost their importance owing to the diminished application of the Leblanc process. In the ammonia-soda process of making sodium carbonate, the only by-product is a solution of calcium chloride, which is usually run to waste; whilst in the electrolytic process the chlorine simultaneously obtained is utilized for making bleaching powder, though apparently more is produced than can be profitably employed. In the manufacture of sulphuric acid the burnt pyrites is sold to be treated for the copper it contains, the residual iron oxide going to the iron smelter.

Gas Works.—In distilling coal for illuminating gas, and in the manufacture of 'Mond gas,' etc., tar and ammoniacal liquor are very important by-products. The preparation from coal tar by Perkin of the colouring matter mauve was followed by the discovery of many other dyes, which are now manufactured in great quantities and of every conceivable shade. Of special importance is the artificial production of alizarin, the colouring matter of the madder root, by Gräbe and Liebermann, in 1869, and of indigo by Beyer in 1878; the former having practically destroyed the cultivation of madder, and the latter having become a dangerous competitor with the natural indigo so largely cultivated in India. Besides dyes, many valuable drugs, such as antipyrin, phenacetin, etc., and flavouring and sweetening agents, such as benzaldehyde and saccharin, are also prepared from coal-tar products. Minor by-products of the gas works are the cyanides and sulphur that can be extracted from the purifying materials.

Blast-furnaces and Coke-Ovens also yield tar and ammonia, as well as a combustible gas which is now largely utilized for heating and driving gas-engines. The slag from blast-furnaces is employed to a small extent to make paving setts, cement, slag wool, and road metal; whilst the slag from basic steel hearths, when finely ground, is a valuable manure. In the preparation of *charcoal*, *tar*, *acetic acid*, *wood spirit*, and *inflammable gases* are by-products, but the greater part of these is generally wasted. In *brewing*, the malt, after extraction, serves as food for cattle, the excess of yeast is available for baking, and the carbon dioxide set free in the fermentation can be collected and compressed for the manufacture of aerated

waters, to force beer through service pipes, etc. In *distilling*, the disposal of the 'burnt ale' is a serious question. If run into streams it produces a very objectionable pollution, whilst other methods of getting rid of it are costly and not thoroughly effective. Decomposition by bacteria has had but little success; the most hopeful method of disposal is by some process of evaporation, the product being used for manure. *Soap and candle works* produce considerable quantities of glycerin as a by-product; *wool-scouring* yields wool grease, employed in the manufacture of lanoline, soaps, and lubricants; the *pressing of seeds for oil* yields a 'cake' valuable for cattle food; *meat-canning factories* produce glue, bone manure, hair, gut, fats, etc.; the *fermentation of wine* is the source of tartaric acid; whilst the residues of the *beet-sugar industry* produce alcohol, potassium compounds, methyl chloride, etc., and those of the *cane-sugar industry* produce molasses and golden syrup. See DYEING, BREWING, DISTILLATION, SODIUM, SULPHURIC ACID, TAR, COAL TAR, SLAG, SOAP, CANDLE, WOOL, and SUGAR.

Byrd, or **BIRD**, **WILLIAM** (?1538–1623), English musical composer, was 'bred up to musick under Thomas Tallis.' He was organist of Lincoln Cathedral in 1563, and in 1569 succeeded to a vacant post in the Chapel Royal, London. He published much sacred music, including three masses; was an indefatigable composer of music for the virginals (e.g. *Parthenia*, c. 1608, in conjunction with Bull and Orlando Gibbons); and in 1588 contributed the first English madrigals to a collection entitled *Musica Transalpina* (1588).

Byrgius or **BURG**, **JUSTUS** or **JOOST** (1552–1633), Swiss mathematician, born in Lichtensteig, in

canton St. Gaul. He was for many years in the service of William IV., Landgrave of Hesse, for whom he constructed globes and a large number of astronomical instruments, and in 1603 entered that of the Emperor Rudolf II. See *Life* by Gieswald (1856).

Byrlaw, a code of law, of very ancient date, by which rural communities were governed in minor affairs, such as the valuation of stock, the allocation of common land, or the limitation of boundaries. This system prevailed in Great Britain until the end of the 18th century, and is not yet absolutely extinct. The 'byrlaw men' forming these courts were elected from the yeomen and farmers. For full references, see Murray's *New Eng. Dict.*

Byrne, JULIA CLARA (1819-94), English social writer, was the sister of Hans Busk. Her works include *Flemish Interiors* (1856), *Realities of Paris Life* (1859), *Undercurrents Overlooked* (2 vols. 1860), which led to reform in workhouses; *Gheel, the City of the Simple* (1863); *Pictures of Hungarian Life* (1869), *Gossip of the Century* (1892), etc.

Byrnle (Norse, *brynja*), the ringed coat of mail worn by the ancient Scandinavian warriors.

Byrom, JOHN (1692-1763), English poet and stenographer, was born at Broughton, near Manchester. While at Cambridge he contributed to the *Spectator* (No. 603) a playful pastoral, *Colin and Phoebe*, which attracted much notice. In 1716 he travelled abroad and studied medicine at Montpellier, and in 1718 returned to England, and taught a system of shorthand invented by himself at London, Manchester, and Cambridge: it was soon superseded by better methods. His diary and letters reveal his association with Bentley, Bishop Butler, Collins, Clarke, and Wesley. His poems, first published in 1773, are witty

and facile. See *Byrom's Journal and Remains*, Chetham Soc. (1854-7); Chalmers's *Life* in 'English Poets.'

Byron, GEORGE GORDON NOEL, LORD (1788-1824), one of the great poets and literary forces of the 19th century, was born in Holles Street, London, on Jan. 22, 1788. His father, Captain John Byron, nephew of the fifth or 'wicked' Lord Byron, having squandered his wife's fortune, died at Valenciennes in 1791, and Mrs. Byron settled in Aberdeen. In the year 1798 Byron succeeded to his grand-uncle's title and estates, and he and his mother settled at the family seat of the Byrons, Newstead Abbey, Nottinghamshire. Two years were spent in a school at Dulwich, and then he went (1801) to Harrow—his experiences at that famous school forming the subject, in later years, of his *Childish Recollections*. The year 1803 is marked by his passion for Mary Anne Chaworth of Annosley. In 1805 Byron entered Trinity College, Cambridge, where he caused considerable anxiety to his friends and the authorities by his irregularities. During this period his poetic impulses had begun to find expression, and in 1807 he published his *Hours of Idleness*. It was severely criticized by Brougham in the *Edinburgh Review*, and Byron retorted in 1809 with his satirical *English Bards and Scotch Reviewers*. On coming of age Byron went abroad, and spent two years in making a tour through Spain, Albania, Greece, Turkey, and Asia Minor. After publishing *The Curse of Minerva*—a poem now only valuable from its rarity—he issued, in 1812, the first two cantos of *Childe Harold*. The success of this splendid poem was immediate. *The Giaour* and *The Bride of Abydos* both appeared in 1813, and in 1814 the fine ode to Napoleon *Buonaparte*, *The Corsair*, and *Lara*. The *Hebrew Mel-*

odies, published in 1815, were written for a collection of melodies arranged by Braham and Nathan.

On Jan. 2, 1815, Byron married Anne Isabella Milbanke, daughter of a wealthy Durham baronet. In January 1816 she left him and returned to her parents. The true cause of this separation has never been ascertained, but it was final. Byron then went abroad, and settled for a time in Switzerland, where he wrote the third canto of *Childe Harold*, *The Prisoner of Chillon*, *The Siege of Corinth*, *Parisina*, *the Dream*, and part of *Manfred*. While in Switzerland Byron met the Shelleys, and formed a friendship with the poet, and contracted an illicit alliance with Claire Clairmont, a connection of the second Mrs. Shelley. From Switzerland Byron passed on to Venice, where in 1819 he became acquainted with the Countess Guiccioli. For three years he spent most of his time in the countess's society, living successively at Ravenna, Pisa, and Genoa. In 1817 he finished *Manfred*, and in the same year were produced *The Lament of Tasso*, *Darkness*, and the *Monody on Sheridan*. *Beppo* appeared in 1818, and *Mazeppa* in 1819. The publication of *Don Juan* began in 1819, and continued for five years. To the year 1821 belong the *Letters to Murray* on Bowles's strictures on Pope, *Marino Faliero*, *The Prophecy of Dante*, *Sardanapalus*, *The Two Foscari*, and *Cain*. To the *Liberal*, a Radical periodical conducted for a brief period by Leigh Hunt, Byron contributed *The Vision of Judgment* (1823), a poetical parody upon a poem of that name by Southey. In the *Liberal* also appeared, in 1823, *Heaven and Earth*, a dramatic poem by Byron, founded on a passage in Genesis. *Werner* was published in 1822, the year in which Lord Byron fulfilled the melancholy duty of witnessing

the cremation of Shelley's body. In 1823 appeared *The Island*, a poem suggested by some of the incidents in the mutiny of the *Bounty: The Age of Bronze*, a satire in heroic verse; and the first canto of the *Morgante Maggiore di Messer Ingigi Pulci*, a translation. *The Deformed Transformed*, the last work by the poet, was published in 1821.

Resolved to aid the Greeks in their struggle for independence, Byron sailed from Genoa, and on Jan. 4, 1821, arrived at Missolonghi. His physical powers proved unequal to the strain, and he died of rheumatic fever on April 19. His body was taken to England, and interred at Hucknall-Torkard, near Newstead.

The keynote of Byron's character was an extraordinary and egotistical sensitiveness, which was a contributory cause of many of his troubles, and everywhere finds expression in his verse. Yet he was capable of great generosity and high feeling. Misanthrope and cynic though he was in some of his moods, he was, nevertheless, a man of many noble impulses; and 'the great poetic heart' asserts itself again and again, even in such a poem as *Don Juan*. And although he chose to play, and in a still greater degree to simulate, the rake and libertine, yet he has written several passages which are the outcome of a deep spiritual feeling. Byron's name and works exercised a wonderful fascination over his foreign contemporaries, and almost the whole of European literature was for a time under the influence of his inspiration.

The best edition of his works is that published in 1898-1901—the *Poetry* (5 vols.), edited by Ernest Hartley Coleridge; and the *Letters and Journals* (6 vols.), by R. E. Prothero (1901). W. E. Henley's edition (1897) is also deserving of notice. His *Life* has been written by the poet Moore (1832-3), Elze

(Eng. trans. 1872), and Nichol (1880); and see memoirs and biographical works by Medwin (1824; new ed. 1898), Leigh Hunt (1828), Lady Blessington (1834; new ed. 1894), Trelawney (1878; new ed. 1887), Countess Guiccioli (1868), and Matthew Arnold in *Essays in Criticism* (1888). See also for the disputed passages in his life Lord Lovelace's *Astarte* (1906), and Edgumbe's *Byron: the Last Phase* (1909).

Byron, HENRY JAMES (1834-84), English dramatist and actor, born in Manchester, was the author of nearly 150 pieces (comprising comedies, farces, burlesques, and pantomimes) produced in London between 1858 and 1882. His most popular success was *Our Boys*, which ran for more than four years at the Vaudeville Theatre (January 1875 to April 1879). His best piece of work, however, was probably *Cyril's Success* (Globe Theatre, 1868). His farces and comedies were characterized by a ready and homely humour, and in his extravaganzas he displayed much ingenuity in punning. He acted occasionally, in his own plays, between 1868 and 1878, and at various times ventured upon theatrical management, usually with disastrous results. He was the first editor of *Fun*, and in 1865 published a novel entitled *Paid in Full*.

Byron, JOHN (1723-86), English vice-admiral, was second son of the fourth Lord Byron, and grandfather of the poet. He accompanied Anson in his voyage round the world (1740-4), and appears during that period to have gained the nickname of 'Foul-weather Jack.' In 1761 he was given command of a small force which was dispatched on a new voyage of discovery. In the *Dolphin* (1764-6) he visited Madeira, Brazil, Patagonia, the Falkland Islands (of which he took possession), the Pacific, including the

Society Islands, the Ladrões, Batavia, and the Cape, and re-anchored in the Downs in May 1766. In 1769 he was appointed governor of Newfoundland, and ten years later he was in command of a squadron in the W. Indies, and fought an action with D'Estaing off Grenada in July 1779. His views concerning the duties of the navy in connection with maritime exploration led to the voyages of Captain Cook. See Byron's *Journal of a Voyage Round the World* (1767).

Byssus ('flax'). (1.) The silky threads by means of which many bivalves attach themselves to a firm surface. The byssus threads are secreted in a gland in the foot which is the homologue of the mucus gland of the snail, and can be speedily renewed if severed. They are seen in very simple form in the common edible mussel (*Mytilus*), which is always attached to its surroundings by a tuft of golden threads. In *Lima* the threads are used to fasten together stones, shells, and calcareous weed to form a nest, within which the animal lives. In some bivalves—e.g. the fresh-water mussel (*Anodon*)—the byssus is present only in the young; in others it is always absent. In the south of Italy and in Sicily byssus threads are woven, mixed with silk, into gloves, stockings, etc. (2.) An extraordinarily fine, transparent textile, woven in antiquity out of a delicate linen thread grown in Egypt and Syria. Hence there were two chief varieties, Alexandrine and Syrian, the latter woven at and near Antioch. It was generally used as a head covering, and seems not to have been made after the 15th century.

Byström, JOHAN NIKLAS (1783-1848), Swedish sculptor, studied under Sergioli at Rome, whence he returned in 1816 with an almost complete portrait-statue of

Bernadotte as Mars. His are the colossal statues of *Charles X.*, *Charles XI.*, *Charles XII.*, and *Gustavus Adolphus*; the altar decorations *Christ with Faith, Hope, and Charity* in Linköping Cathedral, and the sitting *Linneus* at Upsala. He succeeded best, however, with the figures of women and children—*c.g.* his *Juno with Little Hercules*.

Bytown. See OTTAWA.

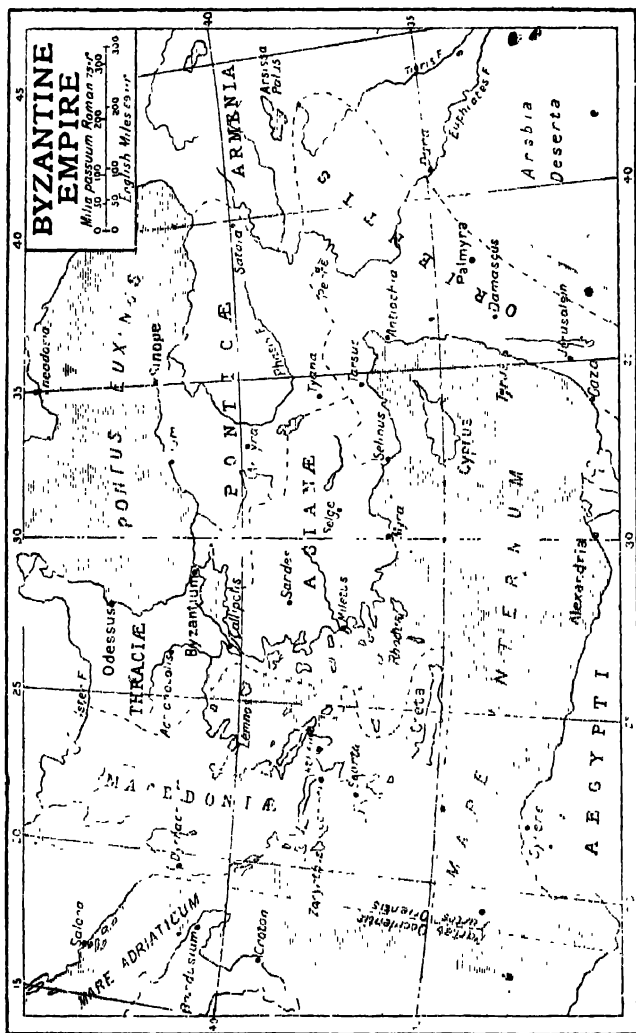
Byzantine Empire. The formal foundation of the Eastern, or East Roman, or Byzantine empire took place in 395 A.D., when Theodosius the Great, at his death, permanently divided the empire between his sons Arcadius and Honorius. To the share of Arcadius fell the Asiatic portions, together with Egypt, Thrace, Mœsia, Macedonia, and Greece.

From 488 onwards the Slavs became the molesters of the empire on its Danube frontier; but the emperors who succeeded Arcadius had rectified the mistakes of Theodosius, and reorganized the army, making the native element more prominent. The consequence was that, while the Eastern was as much exposed as the Western empire to the barbarians, the Eastern empire was preserved intact, while the Western was broken up. Arcadius had been nominally succeeded by Theodosius (408-450), but really by Pulcheria, a sister of the young emperor, by whose advice Theodosius was content to be guided, and whom he designated as his successor. The three emperors who succeeded Pulcheria and her husband Marcianus (450-457), Leo (457-474), Zeno (474-491), and Anastasius (491-518), carried the Eastern empire safely through the storms which proved fatal to the empire of the West.

On the death of Anastasius the sceptre passed to Justinus, and in 527 to his nephew Justinian,

who reigned for thirty-eight years, and dominated his century. Justinian received an intact and, on the whole, prosperous realm; but in spite of the brilliance of his reign, the empire was in a depressed condition when he died, in 565. This was due partly to the oppressive financial measures which his foreign policy rendered necessary, and partly to the terrible ravages of the plague in 542. Personally he is most celebrated as a legislator for his codification of the laws; he is also notable as the supporter, though not the originator, of Byzantine architecture; but his foreign policy renders him not less noteworthy. After a five years' indecisive war with Persia (which is notable chiefly because it revealed the generalship of the great Belisarius, who assisted also in the suppression of the Blue and Green factions in the capital, which, by the 'Sedition of Nika' in 532, nearly drove Justinian from Constantinople) it was possible to direct the forces of the empire, under Belisarius and Narses, to the reconquest of the Western empire from its German invaders. As a result, Africa and Italy and a considerable portion of Spain were added to the Eastern empire. The attention of Justinian's successors, Justinus II. (565-578), Tiberius (578-582), and Maurice (582-602), all of them able administrators, was taken up with meeting the Slavic invasions; but in spite of their ability, the empire was steadily going downhill. Maurice was not able to make headway against the barbarians; and owing to his harsh and niggardly treatment of his army, a rebellion broke out against him which resulted in his murder in 602.

Phocas, who was then raised by the army to the imperial throne, proved much more incapable than Maurice, and plunged



the realm deeper into anarchy and confusion, from which it was rescued by the arrival of Heraclius, the son of the exarch or governor of Africa. Phocas was deserted by his own troops, and Heraclius, in 610, took over the empire, then almost in the throes of dissolution. For twelve years Heraclius strove to reorganize the army and the finances of the empire, without much apparent success. Against the Persians he could not hold his own, till the blasphemous insolence of the Persian king, after his capture of Jerusalem, roused the empire to a religious war, and the churches supplied not only enthusiasm but money, while Heraclius was able to stop the expenditure on corn for the doles to the citizens of Constantinople—an expenditure which, from 616, when Egypt was lost, had paralyzed the treasury. After a prolonged struggle with the barbarian Avars on his northern boundary, he was able in 622 to take the field against Persia; and in six campaigns, in which he showed such skill that Gibbon compares him to Hannibal, he crushed its power completely, and in 628 concluded a glorious peace, which restored the empire to its former boundaries and recovered the cross. But his victory did not secure him rest, for the great Saracen invasion was at hand; indeed, at the very moment of his triumph Mohammed sent out his famous letter inviting the kings of the earth to embrace Islam. The Saracens quickly overran Syria and Egypt; and in 641 Alexandria alone of Egyptian territory remained in Roman hands.

After the death (641) of Heraclius things went from bad to worse, although the empire received a valuable respite, after twenty-seven years' war, by the civil war among the Moslems due to the contest for the Caliphate. This respite enabled Constans II.

(642-668) to reorganize the administration of the empire on practically a war basis. But the energy of the empire was unprofitably consumed in theological controversies, which did not cease even in the face of renewed activity on the part of the Saracens. In 673 the now united Saracens launched a fleet and an army against the capital itself, and for four years strove in vain to capture it. But this success against the Moslem was short-lived, and for a quarter of a century anarchy prevailed, and the empire lost most of its provinces in Asia to the Saracens and in Europe to the Bulgarians, and was only saved from complete destruction by the energy and ability of Leo the Isaurian, one of the generals in the East, who in 716 seized the throne. In 717 Constantinople had to endure another siege by the Saracens; but they were repulsed with heavy loss, and, so far as danger to Europe was concerned, their power was broken. Leo, and not Charles Martel, really saved Europe from the Saracens, for he drove back the main army of advance. For three hundred years longer there was war on the borders, but before Leo's death, in 741, Asia Minor was cleared of the Saracen hosts.

The history of the 8th century is chiefly remarkable for the controversy, regarding image-worship. The successive emperors were in favour of the iconoclasts, and therefore out of sympathy with the priests and the populace of Constantinople. Meanwhile Crete and Sicily were lost to the Saracens, and the theological controversy was not brought to a close till the Council of Nice in 842 decided against the iconoclasts. So long as the Asiatic provinces supplied the emperors the controversy continued, and was not really ended till a European line, in the person of

Basil the Macedonian (867-886), ascended the throne, and the European iconodules triumphed. The Macedonian dynasty which began with Basil continued, with some short interruptions, till 1056. It ruled over an empire which was now solely an empire of the East. Down to the year 800 the West had, through the popes, acknowledged nominal dependence on the East; but when, in that year, Pope Leo III. crowned Charlemagne as Roman emperor, the division of East and West, commenced by Diocletian and continued by Constantine and Theodosius, was finally and permanently completed.

The eighty years which followed the death of Basil in 886 are the most uneventful in the history of the empire. The empire of the caliphs was breaking up, and the Bulgarians were converted to Christianity, and thereafter gave but little trouble; and the Emperors Leo VI. (886-912) and Constantine (912-959) being men of letters rather than men of action, and being left in peace, did not seek war by committing aggression on their neighbours. A period of military glory under the successful general Nicophorus Phocas, who became emperor in 963, but was murdered by John Zimisces, who succeeded him in 969, revived the memory of earlier days; but, except that the Russians made their first attempt on Constantinople in those reigns, nothing of decisive importance occurred. About the middle of the 11th century Isaac I. (1057-9) founded the Comnenian dynasty, which ruled to 1185. A new and more formidable enemy was gathering strength in the East while the dribble of incompetent emperors continued through the 11th century. The forces of the empire which should have been employed against the Seljuk Turks were wasted in almost

continuous civil wars; and after the defeat of the Emperor Romanus by the Seljuk chief Alp Arslan at Mauzikert in 1071, which may be regarded as the turning-point in the history of the empire, no serious effort was made to check the advance of the ruthless enemy. The Turks had reached the Hellespont, when the first crusade gave a much-needed relief. The enemy was driven back 200 miles, and was so badly beaten by the crusaders that for a hundred years he acted mainly on the defensive; and the empire recovered many of its richest Asiatic provinces, and, but for the faithlessness of Alexius I. (1081-1118) towards the crusaders, might also have recovered Syria, which, however, was divided up into Frankish kingdoms. The welter of obscure and incompetent emperors continued during the 12th century, and the empire began the 13th century with a Latin occupation (1204) by French and Venetian adventurers diverted from a crusade by the wily policy of Venice—an occupation which lasted for nearly sixty years, long enough to inflict irreparable injury upon the empire, which never recovered from the anarchy of this time. The feudal ideas of those adventurers, chief of whom was Baldwin, Count of Flanders, were rejected by most of the Asiatic provinces; and in these a succession of usurpers kept alive the idea of the empire till, in 1261, the Latins were driven out by Michael VIII., the founder of a new dynasty, the Palæologi, who ruled to 1282 with some energy and wisdom over a realm greatly shrunken in its European limits. In the interval the commercial importance of Constantinople, on which the prosperity of the empire had largely depended, had been reduced by the opening up, as a consequence of the crusades, of

new avenues of trade with the East. Trading supremacy was transferred to the Italian cities, and much of the little energy that remained in the empire was dissipated in the fruitless struggle with Venice and Genoa.

The restoration of the empire was, however, followed by renewed activity on the part of the Turks; and the Western allies whom the weakness of Andronicus II. (1282-1328) called in did more damage to the empire than to the infidel. In the meantime the Turks—now the Ottoman or Osmanli Turks—deprived the empire of all its Asiatic possessions except a narrow strip opposite Constantinople (1333). In a civil war the usurper John Cantacuzenus (1341-55) called in the Turks to his aid, and succeeded in preserving his own cause by destroying the empire at which he had aimed. Thereafter it was a matter of years only. In 1354 the Turks made their first permanent settlement in Europe by the capture of Gallipoli. In 1361 Adrianople was taken by Murad, but the capital remained for yet a century the sole remnant of the Eastern empire. The Turks devoted themselves to fighting the Serbians and the Bulgarians, and contemptuously allowed Constantinople to maintain a separate parochial history. For a moment in 1402 there was a prospect of relief, when the Tartar hordes under Tamerlane burst into Asia Minor, and the emperor of the East recovered, during the civil war which followed the defeat of the Turkish Bayazid at Angora, some of his ancient realms. But little use was made of the opportunity, and by 1444 Constantinople was again the limits of the empire. In 1452 came the final siege, and after a heroic defence the city was captured by Mohammed II. on May 29, 1453.

The verdict of history has been

come more favourable to the Byzantine empire. For centuries it remained the bulwark of Christianity against the Saracens and then against the Turks. It is to be remembered that it was founded upon the Oriental provinces of the Roman empire, and throughout its history had Oriental characteristics in its court ceremonies and in its diplomacy and administration. It kept alive the tradition of classical learning during the dark ages in Western Europe. Its organization was purely despotic, with no check except the ambitions of its provincial administrators who might rise in rebellion. The policy of the emperors was to destroy all local patriotism, and to remove from ambitious provincials the means of successful revolt. In this way the power of the empire to meet external attack was also weakened. In the latter days of the empire the emperors came to depend almost entirely, not on native troops, but on foreign mercenaries, among which the famous Varangian Guard had a great reputation. See Gibbon's *Decline and Fall of the Roman Empire* (1827; new ed. 1903), Finlay's *Hist. of Greece* (1877), C. W. C. Oman's *The Byzantine Empire* (1886), G. Schlumberger's *L'Épopée Byzantine* (4 vols. 1896-1905), and Harrison's *Byzantine History in the Early Middle Ages* (1900). Sir Walter Scott's *Count Robert of Paris* deals with this subject.

BYZANTINE ART AND ARCHITECTURE. The foundation of a new and magnificent city gave a great impulse to architecture; and the meeting of East and West, Pagan and Christian, Greek and Roman, developed a new style, in which the arch replaced the line of the architrave, and the dome the flat roof of Greek temples, while the Roman basilica formed the basis of the whole, the dome rising from the centre of the cross.

‘The union of engineering skill with exquisite ornament,’ such as marble panelling and mosaic, is characteristic. No less than seven forms of capital were evolved from the Greek columns by the Byzantine sculptors—the impost, melon, bowl, Byzantine Ionic, Byzantine Corinthian, bird and basket, and wind-blown acanthus. The union of the dome, on the grandest scale and in infinite variety, with arched ranges of columns, in rows and in tiers—this was the unique triumph of Byzantine art, and nothing in the history of building has borne a fruit so rich.’ The zenith of this art was reached under Justinian (528), when the architects Anthemius and Isidorus built the church of Sancta Sophia. The church of St. Sergius is also a famous example. Four periods may be noted: (1) 328 to 527 A.D.; (2) 527 to the end of the 8th century; (3) 9th to the 12th century; (4) 1204 to 1453 A.D. In W. Europe copies of Byzantine churches may be found at Ravenna (St. Vitale), Venice (St. Mark’s), and at Monreale, near Palermo. From the 5th to the 11th century ‘the Byzantine and Eastern world preserved the traditions and led the development of art in all its modes.’—*Mosaic*, especially *glass mosaic*—now being revived for mural decoration—was a strictly Byzantine art; so was *enamel*, now the heritage of W. Europe. The Pala d’Oro at St. Mark’s is of Byzantine origin. *Ivory carving* and *jewellery* were produced abundantly, *miniature* and *fresco painting* cultivated with success. *Le Manuel d’Iconographie Chrétienne* (published 1845), found in the hands of the monks of Mt. Athos, and as old as the 11th century, describes fully the designs and processes. *Metal-work* was highly artistic, as may be seen in the bronze doors at Amalfi.

Numismatic art was considerable, if not supreme. *Silk and satin embroidery* was a Greek monopoly, and we read of a senator’s robe adorned with 600 figures representing the life of Christ. And the Dalmatic of the Vatican is renowned. *Samite* is Greek for six-threaded stuff. *Cendal* is *σινδών*, a kind of muslin or taffeta. *Imperialis* was stuff supplied only to the great. *Greek manuscripts*, though in lettering inferior to the Irish, are in miniature painting superior, and the Vatican and Paris specimens are unsurpassed. In *music*, Greek notation was, during the first six hundred years of the Christian era, in universal use, and for the next four hundred, with slight modifications, till the change introduced by Guido Arezzo in the 11th century. The Emperor Copronymus sent to Pepin the first organ seen in W. Europe.

BYZANTINE LITERATURE. ‘The peculiar indispensable service of Byzantine literature was the preservation of the language, philology, and archaeology of Greece.’ From Proclus (5th century) there were never lacking students of the philosophy of Plato and Aristotle. Geometry and astronomy were kept alive, if not much improved. The architects of St. Sophia were mathematicians, and wrote on mechanics. Leo (9th century) lectured on geometry, and composed an essay on Euclid. Michael Psellus (11th century), ‘prince of philosophers,’ treated of mathematics and astronomy. From the 4th to the 11th century there was a regular series of writers on medicine, zoology, botany, mineralogy, and geography. (See Krumbacher’s 1,450 pages.) Epigrammatists formed a class by themselves. Graminarians, scholiasts, lexicographers, produced much useful work and the *Ety-*

